GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

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VOL. CLXXIX., No. 3358.] WEDNESDAY, SEPTEMBER 28, 1927. [79TH YEAR.

EDITORIAL NOTES.

Advent of Official Testings by Recording Calorimeters.

RATHER more than seven years ago—on Aug. 4, 1920—the Gas Regulation Act received the Royal Assent. The Act, *inter alia*, provided for the appointment of Gas Referees, a Chief Gas Examiner, and Gas Examiners. Section 5 empowered the Gas Referees to prescribe "the places and times at which, and the apparatus and method by which, tests—whether continuous or intermittent—shall be made, to ascertain whether any undertakers with respect to whom an Order has been made under this Act are supplying gas in accordance with their obligations." But sub-section 2 imposed upon the Referees one obligation. It provided: "The prescribed apparatus "*shall*, in the case of any undertakers who have sold in "the preceding year more than 100 million c.ft. of gas, "and in any other case in which it appears necessary to "the Gas Referees, include a calorimeter for the pro-"duction of a continuous record of the calorific value of "the gas which is being supplied." The years have passed; but no recording calorimeter has been prescribed for general adoption. The reason is well known. Recording calorimeters had not in 1920 reached a stage at which they could be trusted to act with the precision necessary for penalty testing. The sub-section defined no limit to the time within which the Referees should prescribe the use of a calorimeter for making a continuous record; and they have acted judiciously in not hitherto making prescription. They preferred—and they took the right course—to proceed slowly rather than saddle the industry with considerable expenditure, and perhaps involve it and themselves in a mass of muddle and disagreement.

The years, however, have not been wasted. They have been spent in experiment and observation of recording calorimeters in actual operation on important gas supplies, and in making improvements, with which work Prof. Boys has been so intimately and industriously associated. Experience and experiment have not been confined to the recording calorimeter which he designed; they have extended to others—among them the Fairweather. But now notice has been given of the advent of recording calorimeters for official testings. In the minutes of the Central Executive Board of the National Gas Council, as published in the "JOURNAL" last week (p. 673), this paragraph appears: "It was reported that the Gas Referees "were contemplating requiring the Metropolitan and some "of the larger provincial gas undertakings to provide "at least one recording gas calorimeter, to be brought "into use for official testings as from Jan. 1 next." It will be remarked that this does not say general use; but merely refers to the Metropolitan and some of the larger provincial gas undertakings. This indicates that the Gas Referees prefer to bring about their adoption progressively, probably with a view to enabling individual inspection and observation in the varied circumstances in which the instruments will be installed. If this is the correct interpretation of the clause in the minutes of the National Gas Council, the Gas Referees are, as usual, acting wisely. Recording calorimeters are not things that can be subject to rapid mass production and installation, particularly when they are to be used for official testings, and penalties are to attach—conditionally, of course—to deficiencies. Their gradual introduction into service is unquestionably the best policy.

The Behind-the-Times Critic.

A CRITIC whose animadversions are to be of value and have good effect should be in full possession of the facts of the subject with which he is dealing; otherwise there can be little value, though there may be misleading, in what he says. We have been reading an article in "The Banker" on "Some Reflections on Heating, Lighting, and Ventilation Fittings." The impressions left on our mind are that, while the writer may know something regarding the ancient fittings and apparatus that, conforming with tradition, may be installed in our banking establishments, he certainly does not disclose the modern knowledge that a critic of these things should possess. The criticism of what is installed in banks may have a perfectly sound foundation; but what exists there is not—if the critic is a reliable authority—a true representation of what is on offer by the manufacturers outside, nor can they, with their modern types of fittings and apparatus, be held responsible for what is antiquated within the banks. The article suggests to us that the fittings and apparatus and the critics may not be the only things and person that are antiquated, but that Board rooms and the responsible architects' offices may be tenanted by individuals who, in this particular connection, are of the same order.

The critic submits that the bankers should appoint advisory experts to take in hand the furnishing and fitting-up of their establishments. There can be no objection to that, so long as there is care that the "experts" are properly qualified and impartial, with their interest centred upon their clients, and not upon a particular system of doing a thing. In these matters, there are many "experts" to-day whose training, inclination, and personal interest keep them steadfastly to one agent, and any superior economy or efficiency there may be in another agent is carefully kept out of view. However, our critic also advises that "intelligent craftsmen should be encouraged to produce fittings of fine quality and originality, and the banks have the power to give such encouragement." It happens that "intelligent craftsmen" are engaged by our manufacturers of gas lighting and heating apparatus, who have produced goods of fine quality and original in design, which are as available to the banks as to anyone else; but if the critic is right, then he, the banks, and their advisers in these matters are not cognizant of what is on offer. Nevertheless, we must do the critic justice by quoting a remark which shows that in part he exonerates the manufacturers for the perpetuation of ugliness in the lighting and heating equipment of banks. He writes: "A large part of the responsibility for the mono-"tonous ugliness of heating and lighting fittings does not "rest upon the manufacturers. They have to supply the "demands of their customers; and, in many cases, the

"customer insists upon obtaining fittings similar to those "he has always seen in use." The critic asserts that many people laugh at the suggestion that there is any wide scope for craftsmanship in the making of fireplaces, gas and electric fires, radiators, or anthracite stoves; also that others cannot realize that a badly designed, ill-placed fireplace can spoil the appearance of a good room. He further declares that some of the best modern banking halls have been disfigured by ugly radiators; and there are few gas-stoves which are not positively repulsive. We should like to take this critic and a few bank directors round the works of some of our leading gas-stove makers, to demonstrate to them the extent of the craftsmanship from design to finish that is engaged in the production of the modern high-class gas fires and other gas-heating apparatus. It would be an eye-opener to them. If the critic's reference to "few gas stoves which are not positively repulsive" is intended to apply to gas stoves generally, then we flatly say that the remark reveals his incompetence as a critic; for any of the leading gas showrooms in London can supply him with a complete denial of the statement. What may exist in British banks—if the critic is not exaggerating—does not represent modern styles. He, however, seems to be obsessed with the idea that the gas-fires of to-day are still those of the Victorian era. It is declared by him that "there are many thousands of gas or anthracite stoves in use in British banks; but most of them are standard designs which originated in the reign of good Queen Victoria. They pretend to be fires; and like most shams are as unsatisfactory as they are ridiculous." That is hitting below the belt. The gas industry is not developing a large heating business by gas-fires of the Victorian type. Compared with modern types in efficiency and appearance, they are as different as the old horse 'bus is to a modern motor car.

If we have misinterpreted the critic, then it is his own fault for not making it clear that his scathing attack was limited to what exists in the banking institutions of the country, and does not extend to goods which are actually on the market. If his knowledge compasses the latter, then it would only have been courteous and fair on his part to have called the attention of the bankers to the fact that they are employing heating appliances which are far below present-day standards. Instead of that he cuts off his article at the critical point, which reduces it merely to a piece of destructive criticism without the constructive suggestion which lies ready at hand.

It is true the critic does not omit chastisement of electrical work. He says that "some designs of modern electric fires are distinctly unoriginal. They [the makers] have obviously carefully studied the essential characteristics of the Victorian gas-stove, and endeavoured to adapt it to the requirements of their trade." But he adds there are many manufacturers of electric heating appliances who are producing "some very pleasant and original designs which can cheer and decorate the best of rooms." Of course, to "cheer" and "decorate" are admirable qualities in a heater; but the main purpose of such an appliance is to heat. He also admits that a good deal of progress has been made in the manufacture of electric light fittings; but he designates the metal switch as "hideous," and pokes fun at the "'arty' weak reproduction of a wax candle and other feeble imitations" for lighting. On the other hand, the "ordinary" gas-lighting fitting is described as having "one merit—it is a pure Victorian fossil." Thanks! That is a frank admission of the distance of the knowledge of the writer from present-day actualities.

The article reveals the fact that, with all our advertising and propaganda, this critic who has access to the columns of such an influential magazine as "The Banker" has not been reached and informed. It further indicates the multiplicity of the avenues of publicity in which the gas industry must operate to depose the idea which still prevails in some quarters that gas as an agent for lighting and heating is antiquated and out-of-date. As an agent, it has had existence long over a century; so has coal. But the means of applying gas are as modern as the means of using electricity. They have all had development since the passing of the first Electric Lighting Act, and improvements have since been unceasing. The example of ignorance or professed ignorance, supplied by the writer in "The Banker," suggests also that no gas undertaking should neglect to exhibit in its showrooms samples of the choicest designs of gas fittings and appliances; and no appliance should be exhibited, much less sold or hired out, that is not highly efficient from both the thermal and operating points of view. We have got to impress people that whatever they buy from gas suppliers is dependable; we have to show them, too, that gas lighting and heating fittings and appliances are obtainable to suit any taste, situation, or style of decoration. All these qualities have been made available by our manufacturers. Price must not be the dominating factor; but the exclusion of the inefficient, the ugly, the ill-designed should be an active resolution. The whole country must be shown, and effectively, that we have left far behind those things which were recommended, and with which the industry traded, in the Victorian days.

Improved Standards for Public Lighting.

THE Institution of Public Lighting Engineers are to be congratulated upon the strength of the position they have attained so early in their career. It was reported by the Hon. Secretary (Mr. W. J. Liberty), at the Annual Meeting in Brighton, that the membership had reached 138. Numerically, this may not sound large when compared with some technical bodies; but it must not be overlooked that in this case numbers do not count so much as influence. Most of the members represent extensive lighting areas; and it is in that fact the importance of the Institution is found, accentuated by the further fact that the members are organized with the view of promoting the best standards in a public service which every year is demanding that its fitness to need should grow.

The report of the conference at Brighton, as published last week, reveals the fact that the members are taking an increasing interest in their responsibilities from the scientific point of view. But the proceedings also force upon notice another matter, and this is that, in their studies of, and deliberations upon, a subject which embraces many considerations, an attempt should be made to ensure that all the fundamentals are brought into view, and that there should not be obsession by merely three or four prominent ones—such as heights of standards, spacing, distribution of light, and glare. An important thing in this public service is impartiality. Also, were the responsibilities of public lighting and safety upon our shoulders, we should stipulate, as primary requirements in a system of lighting, that the method of illumination selected should be the one which would give the best account of itself in respect of penetrability in the worst of weathers, and that it should be the most reliable in view of the fast-moving traffic of these times, and of the safety of all using the roadways—whether pedestrians or drivers of vehicles. Public lighting is too precious a thing, having regard to its functions and responsibilities, to be treated in a perfunctory or rule-of-thumb way, or even to be rigorously standardized; and much less must it be made subservient to any particular agent or undertaking. The best efficiency in the worst of conditions and the greatest reliability with the increased risks of the streets, we insist should be predominant in the decisions of our lighting authorities. Standardization on scientific lines (with the necessary flexibility to conform to special circumstances or environment) will apply to any form of illumination; and therefore it is more or less secondary to those fundamental considerations which we have emphasized. The new President of the Institution (Mr. Alex. C. Cramb, the Electrical Engineer of Croydon) holds that there should be standardization not only in the degree of illumination, but in efficiency, and that this should not be subject, as at present, to the violent interruptions that mark the boundaries of neighbouring local authorities. And so Mr. Cramb agrees that there should be efficiency in other matters than the quantitative one of illumination; and we hold that, in the interests of the public, the term "efficiency" should be construed in a comprehensive manner. We would also suggest that, through modern developments in the agents, much improvement in light-

ing can be made economically without a lavish scrapping of all existing equipment and laying-down a complete new one.

The complaint was made by the President that little improvement has taken place in public lighting since 1914. Mr. Cramb was speaking generally, and not of the several exceptions which could be cited where schemes that have greatly enhanced public illumination have been carried out. Nor did he mean that no improvements have been made in public lighting appliances. There has been an elevation in their efficiency; the backwardness has been in their application. There is much work for the members to do in this connection. The tardiness in application is due to the reluctance of local authorities to spend money upon this service, which has grown more rapidly in importance than their ideas of what is necessary. We are thoroughly at one with the President that illumination is equally as important as the construction of roads and the maintenance of their services—important not only to the motorist, but to the pedestrian as a defence against accident—and this appeals to us as a strong reason why illumination should have a place in the category of work which could be assisted from the Road Fund. It would be good expenditure; and we are sure that motorists and the public would concur in this being a legitimate use of part of the proceeds of the special taxation which supplies the fund.

There are many factors which contribute to the highest standards in public lighting. The President dealt with some of them—such as improved fittings, reflecting devices, proper control of the planting of trees so as not to affect the efficiency of illumination, and so forth. A paper treating of the new standard specification for street lighting, which constitutes practically a new charter for this public service, was submitted at the meeting by Messrs. L. B. W. Jolley, J. M. Waldram, and Robert Watson; and in this is included a list of the variables which have to be taken into account in connection with public lighting. The list shows that the illumination of our roadways is no simple matter. It is not claimed that the new specification is without defect; but it is submitted that it carries us a long way towards more scientific public illumination, if only the responsible authorities will, as nearly as possible, comply with its prescriptions. It deals with most matters which come into consideration, among them with the distribution of light on street surfaces, and some attempt is made to obviate the possibility of objectionable glare. The new specification, however, is not exempt from criticism; there is very little in the world, including our most carefully designed advances, that does not contain some openings through which attack can be made. The President, for example, feels that there has been rather a tendency in the specification to emphasize a standard of illumination much in excess of the existing best-lighted thoroughfares in the country. It seems to him that the lighting of such thoroughfares as Whitehall and Oxford Street is ample for all practical purposes. We do not want excessive illumination; that is waste. But as Messrs. Jolley, Waldram, and Watson submit, the specification provides standards and conditions which may not only suit existing street-lighting requirements, but, as far as possible, anticipate what may be reasonably expected in the future. Of course, no one wishes to go to the expense of conversion or improvement, and then before long find that more outlay has to be incurred to effect another change. Mr. J. F. Colquhoun, of Sheffield, for instance, made criticism of the recommended increased heights of standards. He has some misgivings. Although his experiments so far have corroborated a gain in illumination efficiency, the case is not yet strong enough for him to advise his Committee to alter all the undersized standards. As he remarks, having regard to the hundreds of thousands of street standards in the country that are outside the specification, there must be absolute certainty of the ground before asking for the expenditure of the huge sum that would be involved in altering them.

Reverting to the application of part of the proceeds of the Road Fund to the purpose of improving the illumination of our roadways, we agree with the President "that it is of real importance that the lighting of the enormous mileage of less important thoroughfares throughout the country should be improved." It seems to us to be overlooked that the relative importance of the secondary and arterial roads is moving closer through modern traffic. Moreover, between the places of starting and destination of motor cars, there is a tendency for them to travel faster than in the central streets of our cities and towns, where there is greater density of traffic. From these points of view, there is great scope for improvement in the lighting of the so-called secondary roads. We are, of course, not so unpractical as to think that the many miles of connecting roadways between busy centres can be lighted up to the same degree as the main avenues through cities and towns. But there should be improvement, and there should also be a tuning-up of the standard of illumination of many of the roads in urban areas which are the tributaries of the main and therefore better-lighted thoroughfares.

Motoring enables one to see the tremendous variation there is in the standards of street lighting in the different areas of the country, and the considerable differences there are in many places between maximum and minimum illumination. A difference must, of course, exist; but there is good scope for narrowing it to advantage, which is saying in another way what the President said: "It "is important there should be no sudden change in the "degree of illumination on entering from one thorough-"fare to another, which is a fruitful source of accident." Mentioning the less important thoroughfares in our urban areas reminds us that we must not be altogether obsessed by the question of fast-moving traffic. Admittedly it is first in importance; but safety, in more ways than one, calls for an improvement of lighting in places where oftentimes gross neglect is found. We will not here discuss the degree of illumination which should be adopted in any given circumstances as a minimum; but we do hope the specification and the work of the Institution will help to an improvement in the illumination of our streets and by-ways. It is badly wanted.

End of Summer Time.

We were under the impression that "summer time" this year ended, after a brief spell, some time ago; but an official announcement to hand informs us that it will cease next Sunday morning at 3 a.m., when timepieces will have to be put back to 2 a.m.

"Gas Salesman" Supplement.

With this "JOURNAL" is issued the September Supplement, the most prominent feature in which is the highly successful meeting of Gas Salesmen's Circles. The address of Mr. E. Ernest Hunt will be found of especial interest. It was a philosophic and eloquent deliverance, which greatly appealed to the large assembly of salesmen from all over the country.

Foreign Road Material.

It seems that British tar producers are not the only people who have to complain of what has been going on in connection with the importation of material for the construction of roads. The National Joint Industrial Council for the Quarrying Industry have submitted a demand to the Government that British stone shall be used for British roads. The quarry owners at a meeting on Tuesday of last week issued a statement in which the following question appeared: "In view of the large quantities of foreign stone, in particular for use in road making and repairing, which have been imported in the past few years, is it not time that the Government stepped-in, definitely insisting on home-produced material being used by local authorities in their road schemes for the relief of unemployment, &c.?" It seems that objection is made to British material on the ground of inadequate supply; but the quarry owners are satisfied that such an objection could seldom be sustained. They also submit that the compilation of a standard specification for road materials would be of the utmost benefit, as this would enable stocks to be accumulated to meet seasonable demands, without doubt on the part of the producer as to disposal. It is understood that a Joint Committee of Road Engineers and Quarry Owners, under

the auspices of the British Engineering Standards Association, have been considering a standard specification for road material; and a report will shortly be published. The producers of tar and of stone for road purposes might perhaps join hands in their endeavour to secure the fullest possible use of British materials for British roads.

Dearer Household Coal.

It is learned that many of the collieries are advancing their rates for household coal by 2s. to 3s. per ton, as from Oct. 1. More substantial increases are also spoken of. No other section of the market, it is reported, shows the same seasonable activity. Collieries have still ample supplies of industrial qualities; and prices remain easy all round.

House Building.

It is reported that, in all, 97,662 houses are in course of construction at the present time by local authorities and private enterprise with the Government subsidy in view, apart from the unknown number for which no subsidy is sought. There is a great rush to complete as many as possible of the subsidized houses, owing to the reduction of the subsidy by £25 in respect of houses finished after Oct. 1. Another computation is that since the war, with the houses now under construction, a grand total of one million houses will have been made available for the artisan and middle-class population.

Beautifying Roads.

It is learned that keen interest is being shown by Lt.-Col. Ashley, Minister of Transport, in the beautifying of new arterial roads. He is specially concerned with the idea of having them bordered with trees, and has encouraged the work in every possible way. Judging from recent remarks by the President of the Institution of Public Lighting Engineers (Mr. Alex. C. Cramb), the beautifying of roadways in this manner should be co-ordinated with the means for their artificial illumination when daylight fails. So often are trees planted by the roadside without regard to illumination, that this is considerably injured, to the detriment of both vehicular and pedestrian traffic. We admire beautiful roadways; and there is no reason why we should not have them, providing that "Safety First" is the motto, and illumination and tree planting are taken into consideration in a manner which will harmonize utility and effect.

Paint Research.

The paint, colour, and varnish manufacturers are the latest group of industrialists to form a Research Association under the Government scheme, by which firms engaged in the same industry may, with Government aid, co-operate in the task of conducting scientific investigations in their common interest. Information concerning this was supplied by Dr. L. A. Jordan, Director of the New Research Association, at an inaugural luncheon last week. The organization, he stated, would devote its whole attention to the technical side of the paint, colour, and varnish industries; but in no sense would its work dispense with that of the scientific staffs already in existence at paint factories. There are, of course, many problems requiring solution which are much too large for individual firms to tackle. Probably the Association will find a useful field for research in paints for structures exposed to gases of a harmful order. The new research station is in the Waldegrave Road at Teddington. It has a floor space of approximately 6000 sq. ft.

A Good Sign.

The National Union of Railwaymen, the Society of Locomotive Engineers and Firemen, and the Railway Clerks' Association, are responding well to the endeavours of the London, Midland, and Scottish Railway Company to bring about greater prosperity for the railway industry. At the first of a series of meetings of officials of the Company and of the Unions, a resolution was passed welcoming a declaration of the Company's policy (which is in harmony with trade union policy), and undertaking to use every endeavour, by mutual co-operative effort, to further the business interests of the railway. Every individual member of the staff in all departments of service has been urged to give all possible assistance to his representatives, and to use every legitimate personal effort to further the aims and objects of the new movement.

Alliance of Workers.

The proposal that there should be an alliance of the trade unions of the country has received a further rebuff. An announcement has been made by Mr. Ernest Bevin, General Secretary of the Transport Workers' Union, that they have decided to terminate any association with the project. The Union have restored the old rules which vest sole authority in their own Executive and Delegate Conference. The alliance was one of Mr. Cook's schemes, which was developed at largely attended joint conferences in the summer of 1925, at which no less than three million trade unionists were represented. It will be remembered that the N.U.R. withdrew at an early stage.

Non-Political Miners' Union.

Another favourable sign of a change in the labour world is provided by the action of the Executive of the National Union of Seamen, at a meeting last Friday, in unanimously resolving to accept a resolution and recommendations passed by a special conference of delegates on Aug. 1, to loan to the Non-Political Miners' Union a sum of not less than £10,000. The progress of this non-political organization is giving genuine concern to the Executive of the Miners' Federation. In addition to the several successful branches established in the country, it is stated that the new organization is about to open a branch in Barnsley, which is the headquarters of the Yorkshire Miners' Association. Meantime, we see that Mr. A. J. Cook, the Secretary of the Miners' Federation, is starting a new campaign, with the view of trying to stop the flow of members to the non-political organization. In doing this, he is proclaiming that the Miners' Federation are out for a six-hour day and for a minimum wages Bill "with a figure in it," and are proposing to get rid of the present percentage system. The miners have had a large experience of Mr. Cook's sops.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Sept. 30.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Annual meeting at Cambridge.

Oct. 3.—SOCIETY OF CHEMICAL INDUSTRY (LONDON SECTION).—Meeting at the Royal Society of Arts, Adelphi, at 8 o'clock. Address by Mr. W. J. A. Butterfield on "The Gas Industry; Past, Present, and Future."

Oct. 3-5.—BRITISH COMMERCIAL GAS ASSOCIATION.—Sixteenth annual general meeting and conference at Southampton.

Oct. 8.—WESTERN JUNIOR GAS ASSOCIATION.—Meeting. Address by Dr. M. W. Travers, F.R.S.

Oct. 8.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Cardiff. Visit to the Grangetown Works of the Cardiff Gas Light and Coke Company.

Oct. 14.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.—Autumn meeting at Newcastle-upon-Tyne.

Oct. 15.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting at Edinburgh. Paper by Dr. Harold Hartley.

Oct. 27.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Autumn general meeting. Grand Hotel, Birmingham, at 2.30.

Nov. 5.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Joint meeting with the Western District at Glasgow.

Nov. 5.—WESTERN JUNIOR GAS ASSOCIATION.—Meeting. Papers by Mr. J. Malsbury, B.Sc., of Weston-super-Mare.

Nov. 17.—SOCIETY OF BRITISH GAS INDUSTRIES.—Autumn general meeting at the Hotel Cecil.

INSTITUTION OF GAS ENGINEERS.

Oct. 10.—Emergency Committee.

Oct. 10.—Finance Committee.

Oct. 11.—Education Committee.

Nov. 15.—Public Works, Roads, and Transport Congress. Morning—Joint Session with Incorporated Municipal Electrical Association for discussion on "Street Lighting." Afternoon—Institution Session for discussion of "How the Gas Industry can Assist Smoke Abatement."

PERSONAL.

Mr. RALPH HALKETT, Jun., has been appointed Assistant to his father, Mr. Ralph Halkett, the General Manager and Secretary of the Sheffield Gas Company. He has just completed a five years' pupilage with the Sheffield Gas Company, and has passed through all the different departments of the undertaking. At present Mr. Halkett, Jun., is serving for a short period under Mr. Philip G. G. Moon, the Engineer and General Manager of the Bournemouth Gas and Water Company; and he will take up his new duties on Oct. 1.

Mr. JOSEPH GARDNER has been appointed Chief Chemist to the Sheffield Gas Company, in succession to the late Mr. John T. Sheard. Mr. Gardner has for the past eight years held a similar position with the Wigan Corporation Gas Department. He was previously twelve years in the laboratory of the Wigan Coal and Iron Company, during which time he had considerable experience with the Semet-Solvay coke oven bye-product plant, finally being appointed Senior Assistant. During the war he served four years with the Honourable Artillery Company (R.H.A.), and saw 3½ years' active service in Egypt and Palestine.

Hearty congratulations to Mr. and Mrs. S. SHADBOLT, who celebrated their silver wedding on Sept. 25. Mr. S. Shadbolt, who is Engineer, Manager, and Secretary of the South Bank and Normanby Gas Light and Coke Company, is an energetic man, and leads a full life both within and without his profession. He is a Past-President of the North of England Gas Managers' Association, and has served, as representative of the Association, on the Council of the Institution of Gas Engineers. A most useful member of the Regional Council, his services and advice are sought by neighbouring smaller undertakings As for his activities in communal affairs, he is a member of the local Urban District Council, and of the local Rotary Club (the meetings of which are held in the gas-works recreation room). In addition, he is Commanding Officer of the local Ambulance Corps. Mr. Shadbolt is a Freemason, and this year is the W.M. of the Northern Star Lodge.

Mr. F. HILL, who has been Manager to the Usk Gas Company since 1895, occupies an unusual position, for he is only the second Manager the undertaking has had over the long period of 76 years. His predecessor was Mr. J. T. Cherry, who managed the Company from its commencement in 1851 down to 1895. We hope that it will be long ere the Company is in need of a third Manager, for the business is prospering under present conditions. A dividend of 6 p.ct. has been declared, in spite of the troubles of the past year; and at the meeting the Chairman congratulated Mr. Hill upon the satisfactory manner in which he had managed the concern.

On the 22nd inst., at Ardglass Presbyterian Church, Miss Isabella Airth, younger daughter of Mr. GEORGE AIRTH, Engineer, Manager, and Secretary of the Dundalk Gas Company, and the esteemed Hon. Secretary of the Irish Association of Gas Managers, was married to Mr. Gerald P. Twibill, son of Mr. William Twibill, Chairman of the Dundalk Harbour Commissioners. Among the presents received by the bride was a grandfather clock from the employees of the Gas Company. The bride is well known to the members of the Irish Association, who will join with us in wishing her a long and happy life.

OBITUARY.

MRS. W. E. PRICE.

His many friends in the Institution of Gas Engineers, the National Gas Council, and the other organizations with which he is so closely and honourably identified, and others outside those circles to whom he has endeared himself, will learn with grief that Mr. W. E. Price has met with a severe bereavement in the death of his wife. This sad event occurred in a nursing home at Brighton last Thursday. Mrs. Price had been in indifferent health for a considerable time. It was hoped that she would have recovered; but, alas, it was ordered otherwise.

The funeral took place on Monday afternoon in the cemetery at Brookwood, Surrey, well known because of the natural beauty it possesses. In the church there a number of friends had assembled when the cortege entered, preceded by the Rev. W. J. Hill, M.A. (brother of the deceased lady), and the Rev. E. O. Burbidge, M.A. By them the solemn service in the church and at the graveside was impressively conducted. As the committal sentences were being pronounced, the autumn sunshine appearing seemed to suggest thoughts of abiding life —of triumphant immortality.

The principal mourners who followed were Mr. W. E. Price and two of his three daughters (Mrs. Brereton, home from Kenya, and Miss Elsie Price—the other daughter, Miss Kathleen Price, is now away in Kenya); Mr. Thomas Price, of Walton-on-Thames; and his son, Mr. Conrad T. Price, M.C., of Hampton Wick.

Among others present were noticed Mr. Frank Packham, Mr. J. Symmons, and Mr. Charles W. Kent, M.A., Directors of the Hampton Court Gas Company, of which Mr. Price is Managing Director; Mr. W. C. Lamb, Secretary of the Company; Mr. Walter T. Dunn, Secretary of the Institution of Gas Engineers; Mr. Alex. A. Johnston, J.P. (formerly of Brentford and now a neighbour of Mr. Price at West Chobham); and Mr. Edward G. Hutchinson (formerly of Richmond).

There were many exquisite floral tokens of affectionate remembrance, testifying to the high regard in which Mrs. Price was held by friendships formed through her various activities.

We desire to associate ourselves with the expressions of heartfelt sympathy with our friend Mr. Price and his family on this sorrowful occasion.

ELECTRICITY SUPPLY MEMORANDA.

Launching and Lunching.

To enthuse electrical men in the first six-monthly mission for the development of public interest in electricity supply, the big drum was beaten unceasingly last year. This year, in connection with the second six months' campaign, less preliminary noise is being made. The plans that have been formulated for the campaign suggest, however, the recognition of the need for something out of the ordinary to arouse the people to what is on offer in the way of domestic electrification at a high price, without guaranteed constancy of service or immunity from—by them undetectable—peril. To inspire the different elements of the electricity industry with the importance of the Circle campaign, there may, of course, have been much passing of confidential communications from "E.D.A." Anyway, the electrical Press does not appear to have shown any particular fervour over the event. Their references have not had the vigour and space devoted to them as was the case before the 1926-27 campaign; and the time is approaching for launching and lunching. Oct. 3 is the great day; and then the local Circles are expected to inaugurate the campaign by inviting those interested, or who may be of use to them, to lunch; and, above all, the local Press representatives are to be feted. We read that at all the lunches the local Press representatives will be the guests of "E.D.A." Does this mean that the Circles are not in the position to bear the expenses alone, without aid from the central funds? That cannot be in all cases; for we are also told that "big luncheons are being organized for Oct. 3 in London, Glasgow, Manchester, Newcastle-upon-Tyne, Cardiff, and Belfast. Grimsby, Greenock, and Hampstead are among many other centres where similar functions are being organized." There seems to have been a little central prompting, for in one paper we read: "It is hoped that a luncheon will be held, and a national message be delivered in any and every place where a score of electrical men can foregather at 1 p.m. on Oct. 3." Another journal says: "It is the wish of the Council of the 'E.D.A.' that in any place where (say) a dozen electrical and allied men can be gathered together, a lunch shall be held, and the 'E.D.A.' national message delivered, which will doubtless receive its due meed of publicity through the Press guests, for whom 'E.D.A.' will be responsible. The series of "E.D.A." conferences is to open on Sept. 30 with an address, by Mr. V. W. Dale, on the Circle Campaign.

Flex and Reflex.

The electrical papers do not appear to have made up their minds what is exactly the correct policy for them to adopt regarding the recent fatalities due to defective flex and other wiring. These mishaps are an uncomfortable reflection upon their nimbly presented praise as to the safety of electricity, notwithstanding a long record of testimony to the contrary. "Megohm" in the "Electrical Times" has touched upon the subject. He hopes that the large amount of publicity which has been given to the Newport fatality (we would add, "and others") will make "the public more alive to the necessity of flex renewals." That is simply put, and it is the trouble. The public do not know much about the question of flex renewals; and the electricity undertakings seem to be afraid to educate them up to a proper standard of appreciation. They cannot smell, and cannot always see, when anything is wrong; and, as recent fatalities have shown, they only receive notification when a life is lost. However, "Megohm" says what has happened does raise the question whether the present type of flex which is now generally employed is the best adapted for the general service demanded from it. He discusses the matter up and down from the technical standpoint, including the wiring of standard lamps; but this is all for the technical man. It is the consumer who requires warning and

instruction. Why do not the electricity undertakings face the responsibility? Cannot they brace themselves up to the task?

Sound Advice.

Apropos these matters, we notice in "Pitman's Building Educator" some sound advice by Mr. F. C. Raphael, M.Inst.E.E., in a chapter on "Electrical Fitting." He says that "if a portable electric appliance is such that there is a metal case or frame which would become charged in the event of the insulation of the appliance breaking down, and if it is to be used in a room with a cement or stone floor, or in a place where any earthed metal such as gas, water, or heating pipes are within reach, the appliance must be earthed. This applies even to metal lamp standards, if used in such situations; also to electric fires and other metal-covered domestic appliances. Electric cookers, for instance, should invariably be well connected to earth through the lead sheathing of the cable or the conduit, as the case may be. The same applies to electric irons which are used in any rooms where the floor is not wooden or covered with carpet or linoleum. For portable apparatus which is to be earthed, three-pin plugs and triple flex are employed, the third socket of the wall socket into which the third plug fits being connected to the sheathing or conduit." Regarding flex, the author says it is false economy to employ anything but the best insulated kind. If the insulation within is inferior, the flex will have a short life, and may ultimately become a source of danger. It is, of course, well for those engaged in new building work to have this and other information as supplied by Mr. Raphael; but people who live in existing houses, and who sometimes employ electrical contractors who do cheap and therefore inferior work, are the ones who require warning. To give them this is the duty of those who supply electricity.

Strike Against Overhead Wiring.

We admire the robust character of the people of the ancient Royal town of Corbridge—a village about 18 miles west of Newcastle-upon-Tyne. They love the old town and its beauties, and they see something crude and disfiguring in poles standing in their old-world streets, with wires suspended between them, for conveying electricity. They say it is sheer desecration; and they are not going to tolerate it. The Tynedale Electric Supply Company are the vandals who have done this thing; and they claim that they have a right to do it. The inhabitants in public meeting have plainly told them that, right or wrong, they intend that, if the Company desire to present this service to the people, they must do so in a way which shall not damage the picturesque; and we do not blame them. They consider that a modern agent should be transmitted by more refined methods than unsightly poles and suspended cables. They are going to teach the Company that their ideas of what is satisfactory and good enough for Corbridge can be annihilated by the inhabitants. In public meeting, they have passed a resolution pledging themselves to abstain from using electricity until there is compliance with the demand for the removal of the poles and overhead cables. The Company have therefore to choose between their distributing plant in the town standing unremunerative, or placing the wires underground and getting consumers. There is a lesson in this for the electricity industry. It is meeting with a great deal of opposition in this matter of overhead transmission; and, while electrical men are urging that the Central Electricity Board and the Electricity Commissioners should do this and that, whatever rulings they may give, or suggestions they may make, it is the public who have the final voice. If the public refuse to draw electrical current from cables supported by poles, then it is no use erecting them. Who are the stronger—the public, or the Central Electricity Board and the Electricity Commissioners, backed by the Government? Every time, the public.

Conditions for Sheffield Tenants.

We see from the local papers that the Sheffield Corporation have built thirty houses—asserted to be all-electric ones—on the Longley Estate, and are now prepared to have tenants for them. The conditions on which tenants will be accepted are particularly interesting—and amusing. In the first place, only persons anxious to live in "all-electric" houses (which are not all-electric) need apply. How they should know that they are really "anxious" to live in "all-electric" houses can only be realized by experience—with the experience, the anxiety might diminish. The houses are equipped for electricity only—so it is said; but the tenants may, if they so desire, use coal and coke or similar hard fuel for cooking and in the fire places. We fail to see how such houses can be described as "all-electric" if the option exists to use an alternative method of heating. It is clear from this condition that gas is prohibited. Then it is stated that, if any tenant does not use electricity to a reasonable extent for domestic purposes, he will be expected to give up possession of his house, and may be required by the Corporation to do so without alternative accommodation. This seems extraordinarily hard; and who, by the way, is to be the person who will determine what is a "reasonable extent?" The tenants are also to keep the inside of the houses in good repair and condition. They are not to sub-let; and, painful to relate, they may not keep fowls or pigeons, unless the Corporation, in their wisdom, allow it. The electric equipment will include a boiler for the washing of clothes, and the kitchen will be wired so that an electric cooker can be used; but this has to be hired. Plugs are provided for a kettle; also in the parlour and on one of the landings for the use of electric fires or radiators. The landing plug is intended to enable the fire to be used in any of the bedrooms, which suggests that a large amount of dangerous flex will have to be employed, and in situations which will expose it to injury.

Rent and Charges.

So much for the conditions and electrical equipment. Eight of the houses are of the non-parlour type, and have two bedroms; the remainder have three. This shows that the houses are of very modest order. The rent and rates are 10s. 0½d. and 12s. 3d. respectively, including water charges. The farthing is curious. For electricity, the ordinary flat rate or the inclusive domestic rate can be adopted by the tenants. The flat rate is 4d. per unit for lighting, and 1d. per unit for heating, *plus* meter rents. The inclusive domestic rate is 10 p.ct. per annum upon the net assessment for rateable value, payable quarterly in advance, *plus* ½d. per unit consumed with no meter-rental. The present increase in the prices of electricity is 15 p.ct. on charges of over 2d. per unit, and 30 p.ct. on 2d. per unit or under. The present increase on the rateable charge is 30 p.ct. These advances are subject to revision at any time by the Electricity Committee. The rateable charge per quarter on the present assessments will be 5s. 6d. for the three-bedroom houses, and 4s. 3d. for the two-bedroom houses, *plus* 30 p.ct. in each case. The estimate of consumption of electricity and cost for the tenants in respect of a three-bedroom house is as follows:

—	Total Units per Annum.	Cost, all Charges.
		£ s. d.
Electric lighting and wash-boiler . .	568	2 19 4
Lighting, boiler, and cooker	2568	9 17 8
Lighting, boiler, cooker, kettle, and iron	2910	11 4 3
Lighting, boiler, cooker, kettle, iron, and one fire	3638	13 13 8

The cost for the two-bedroom houses would, of course, be slightly less.

"B.C.G.A." SOUTHAMPTON CONFERENCE.

Invitations to Ladies.

As there appears to be some doubt in the minds of members with regard to invitations for ladies, this opportunity is taken to make it clear that it is not possible for the Southampton Gas Light and Coke Company to invite ladies to the dinner on Monday evening, Oct. 3, other than two or three attending in their official capacities—such as Dr. Margaret Fishenden of the Fuel Research Board, Miss Muncaster of the British Housewives Association, and the British Commercial Gas Association's own Editor and Consultant.

The Chairman and Directors of the Company, however, will be pleased to welcome ladies to the inspection of R.M.S. "Majestic" on Monday afternoon (and thereafter to tea) and to the reception and lecture on Tuesday evening.

In order that the necessary arrangements for the comfort of visitors may be made, members are requested to notify the Secretary of the "B.C.G.A." if they will be accompanied by one or more ladies at the two functions mentioned.

Sir John Cass Technical Institute.—The inaugural ceremony of the session 1927-28 will take place at the Institute, Jewry Street, Aldgate, E.C., on Monday, Oct. 10, at 8.15 p.m., when Sir William H. Beveridge, K.C.B., will give an address.

Wales and Monmouthshire Junior Gas Association.—The first meeting of the session will be held at Cardiff on Saturday, Oct. 8, when Mr. T. V. Blake, of Cardiff, President for the 1927-28 session, will deliver his Presidential Address. A visit will be paid to the Grangetown Works of the Cardiff Gas Light and Coke Company.

Papers on Coal Cleaning.—The Society of Chemical Industry have reprinted the papers read at the Coal Cleaning Conference held in Edinburgh last July under the auspices of the Joint Committee of the Coke Oven Managers' Association, the Institution of Gas Engineers, and the Fuel Section of the Society of Chemical Industry. Copies of the reprint (price 2s. 6d. net, post free) may be obtained from Dr. J. P. Longstaff, the General Secretary of the Society.

SOUTHERN ASSOCIATION AT TORQUAY.

THE GUESTS OF THE GAS COMPANY.

It will be recalled that at the luncheon which preceded the annual general meeting of the Southern Association of Gas Engineers and Managers last March, Major Robert P. Kitson, J.P., C.A., the Chairman of the Torquay and Paignton Gas Company, extended to the members, on behalf of himself and his co-Directors, a cordial invitation to visit Torquay for their September meeting. It was accepted with great alacrity. The Chairman pointed out on that occasion that his Company had within the last few years amalgamated with the Paignton Gas Company, and that more recently they had taken over the St. Marychurch Undertaking of the Torquay Corporation—this being among the first examples of a company purchasing a corporation undertaking. They were now, he explained, concentrating the manufacturing operations at the Hollacombe Works, where a good deal of new plant had lately been installed, and more was being put down. Therefore, though they were not very large works, the visitors would find something to interest them there. The Chairman was right; the members did find on the works a great deal to interest them, when they paid their visit last Friday.

THE HOLLACOMBE WORKS.

It had been arranged that the members should assemble in front of the Torquay Pavilion, where motor coaches would be in attendance to convey them to the Hollacombe Works. At the appointed hour, they turned-up in goodly numbers—especially considering the distance of Torquay from the works of many of the members—under the leadership of the President (Mr. Thomas Hardie, M.Inst.C.E.), who was accompanied by the Hon. Secretary (Mr. H. C. Smith). There was present to give them the warmest of greetings Mr. C. G. Dawson, the Company's genial Engineer and General Manager; and without undue delay a start was made. But, alas, the very first movement of the coaches proved the signal for the commencement of a merciless downpour of rain which persevered throughout the day's proceedings. The warmth of the welcome could compensate for much; but unhappily it was powerless to clear the view, and so the magnificent scenery of which Torquay is so justly proud remained hidden from the visitors. Mr. Dawson, who knew even better than the guests what a treat had been prepared for them, was still more disappointed than they were at the weather turn. Fortunately, however, he had arranged for a circuitous route to be taken to the works; and as the rain had not then got thoroughly into its stride, some good views of Torquay coastal scenery were obtained.

To some extent, also, the rain interfered with the inspection of the gas-works, though the members did not permit it to baulk them in their determination to see the plant erected and in course of erection there. "Follow the man from Cook's," cried Mr. Dawson; and they followed—nearly all of them—to learn everything that could be told them by Mr. Dawson, the Works Superintendent (Mr. A. J. Jackson), or the Chemist (Mr. F. A. Butt).

What they saw will be found fully set out in an illustrated article appearing elsewhere in this issue of the "JOURNAL." First and foremost, of course, was the installation of Glover-West vertical retorts, which has been arranged on the site of one of the existing coal store buildings, and is to provide a daily capacity of 2 million c.ft., with provision for further extension. The work now in progress will bring the total gas making capacity up to 3 million c.ft. per day. The selection of Glover-West vertical retorts for the extensions at Hollacombe was influenced mainly by the fact that this system has been particularly successful in carbonizing Durham coals, which are almost exclusively used by the Torquay Gas Company.

In other directions, the purifiers are being extended by Messrs. C. & W. Walker and F.C. Construction Co., Ltd., to double the original capacity; and the steam supply for the carburetted water gas plant and other works purposes is being increased by the installation of three new Lancashire boilers. Then there is the telpherage system designed and supplied by Messrs. Strachan & Henshaw, as well as various other items of note. Particulars are included in the illustrated article of the carburetted water gas plant installed by Messrs. Humphreys & Glasgow, and of the condensing and washing plant supplied by Messrs. W. C. Holmes & Co.

LUNCHEON WITH THE CHAIRMAN AND DIRECTORS.

Leaving the works, a move was made to the Grand Hotel, where a large party sat down to luncheon as the guests of the Chairman and Directors of the Gas Company. Major KITSON was in the chair, and was fully supported by his colleagues on the Board—among whom, of course, is Mr. Robert Beynon, who was formerly Engineer and Manager to the Company, and is one of the oldest members of the Southern Association. The Mayor of Torquay (Mr. F. J. Marnham, J.P.) was there, and so was Alderman Fred. J. West. Mr. Dawson, of course, was present, together with the Secretary of the Company (Mr. S. H. Easterbrook). A number of prominent local public men and officials were also among the guests.

The Loyal Toast having been duly honoured,

"THE BOROUGH OF TORQUAY."

Alderman FRED WEST said it was his privilege to submit "The Borough of Torquay," coupled with the name of his Worship the Mayor. They had had an opportunity, despite the weather, of seeing some of the wonderful advantages of Torquay; and they could appreciate its glorious setting and its wonderful lay-out. The Corporation had always displayed enterprise and initiative; and it was the hope of the visitors that the borough might achieve the success in the future which it had enjoyed in the past.

The MAYOR, in the course of a breezy reply, remarked that climate, scenery, and visitors were the three great assets of the town.

"KEEPING UP WITH THE TIMES."

The CHAIRMAN said the toast he had the honour to propose was that of "The Southern Association of Gas Engineers and Managers." Those connected with the Torquay and Paignton Gas Company were exceedingly pleased to see so many there that day. Administrators of gas undertakings were greatly indebted to the engineers and managers for all that they did—for the improvements they carried out in the manufacture and distribution of gas, and for the incessant trouble and work which they undertook for the benefit of directors and shareholders. In these days of competition it was, of course, absolutely necessary that they should keep thoroughly up to date with everything connected with gas-works; and he trusted that their inspection of the Hollacombe Works had led them to the conclusion that the Torquay Gas Company were endeavouring to do so. ["Hear, hear."] As the members were aware, it was only quite recently that the Torquay Company amalgamated with Paignton, and still more recently that they purchased the St. Marychurch gas undertaking of the Corporation. Some little time must elapse before the completion of all the improvements that were in contemplation; but they were continually moving, and the Directors felt that, under the superintendence and advice of their capable Engineer and Manager, Mr. Dawson, they would be moving in the right direction. As was the case with other gas companies, they had competition to contend with, the electricity supply being in the hands of the Corporation; but he thought he could say that it was a friendly competition. They were extremely pleased to have the Mayor and many of the officials with them that day. Both gas and electricity showed great improvement on the heating and lighting arrangements of their ancestors; and he did not think the gas industry need for many years fear competition.

THE EXAMPLE OF TORQUAY.

The PRESIDENT, responding, said the members of the Association greatly appreciated this opportunity of visiting the Torquay Gas Company's works. They had seen an up-to-date works which was being got ready to meet the growing demands of the district. The Company had in their Engineer and Manager a very representative member of their Association. What he was doing at Torquay in the way of development had been, or was being, done by almost all their members. Engineers and managers, by studying the subject of carbonization from all sides, by studying methods of transport of material, and by studying the cheapest means of producing power, and other matters, were doing their best to produce gas at the lowest possible cost; and he did not think there was any better way of obtaining the necessary information than by visiting other works. They had had an opportunity of seeing what was being done at Torquay; and he was sure they would all take away some ideas of which they would be able to make use.

VALUE OF VISITS.

He thought that the plan of visiting works could even be extended with advantage. There was sometimes too much of an idea in the minds of boards of directors and local authorities that visits to works were only social gatherings. Really they were very much more. There was a vast amount of information to be obtained by visiting works; and this could be taken advantage of to a still greater extent. Lately the Coke Oven Managers had gone across to Germany and other parts, and had spent considerable time there. He was not going to suggest that the Southern Association should visit in a body Germany or other places on the Continent; but there were a large number of works in this country—not only gas-works, but other works also—where much information could be obtained which would be of great use to them as managers of gas undertakings.

COSTS ON THE DISTRIBUTION SIDE.

While the manufacturing side of the gas industry was going ahead so quickly, they were also considering the consumers from the point of view of service; and on this side he did not think they had been quite so successful as they were on the side of the production of gas. If they looked back over some years, they found that the real cheapening of the production of gas had been largely brought about by the use of mechanical power. It had been by this means that they had reduced their costs. Their labour charges were low, and at the same time their carbonizing efficiency was high. From this point of view they were reaching a position whence they could not see promise of any vast improvement. But when they looked at the side of the consumer, and at what they were doing for him, it was seen that they were going the other way. They were having

to accomplish this work by increasing the labour charges. He thought himself that this was a matter which members of the Association should consider very carefully. They desired to secure efficiency; but they wanted to get this efficiency by the aid of gas and apparatus which would give it without attention such as they were having to give to-day. It was for the members of this Association, which contained all the clever men in the gas industry ["Hear, hear," and laughter], to find out how this could be done, and so cut-down the costs on that side in the same way as had been done on the producing side.

THE HOSTS.

Mr. C. VALON BENNETT (the Vice-President of the Association), proposing the toast of "The Torquay and Paignton Gas Company," said that for twelve years past he had visited Torquay every year; and on many occasions he had passed the Hollacombe Works. He could see to-day, even without going inside, the amount of progress that had taken place there; but upon entering the gates, one was still more impressed. It was easy to observe that this was not a backward company. It was a pleasure to them all to see that a Past-President of the Association, who was Engineer to the Company for many years, was now a member of the Board. ["Hear, hear."] For his successor, Mr. Dawson, they felt lively admiration—because of his success as an engineer, and because of his genial nature. In addition to the Chairman and Mr. Easterbrook, he would like to couple Mr. Dawson's name with the toast. The progress of the Company had been great in the past; and the visitors felt sure it would be still greater in the future. Their hope was that the Chairman and his colleagues on the Board, and the officers who served the Company so well, would be spared for many years to come to continue the good work. That the Company had absorbed an undertaking previously owned by a municipal authority was the greatest testimonial that could be given them. The inhabitants must feel assured of a "square deal" all the time; otherwise the municipal authorities would never have parted with their undertaking. A greater compliment could not be paid the Gas Company; and it went to prove that their progress was not only good for the shareholders, but for the community in general.

The CHAIRMAN having briefly acknowledged the toast,

Mr. S. H. EASTERBROOK said that the kind words of the proposer would remain with them for many a day.

Mr. DAWSON thanked the speakers for their generous references to himself, and said they were doing all they could at the works to cheapen their gas and give the right quality.

Mr. ROBERT BEYNON was also called upon, and briefly acknowledged the toast.

INSPECTING A POTTERY WORKS.

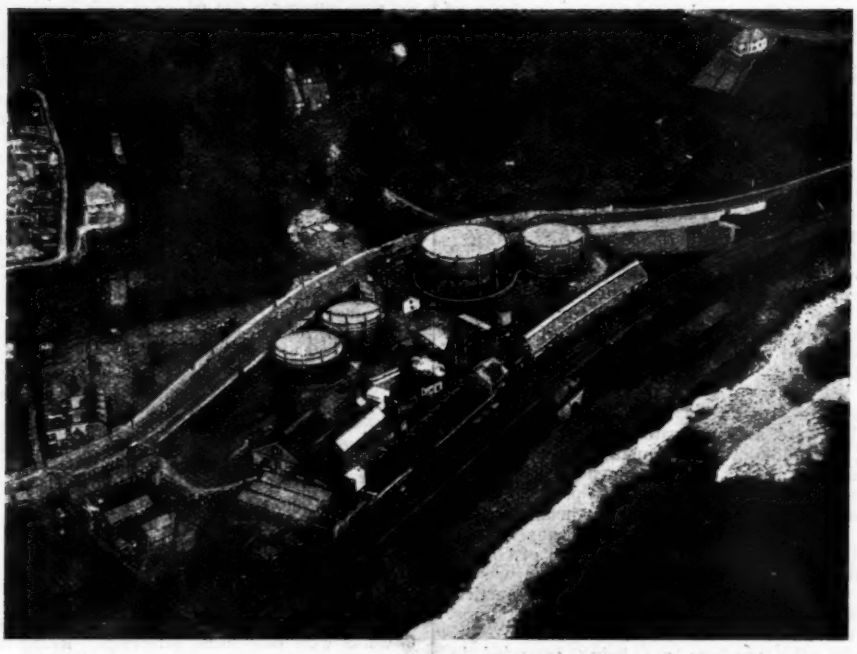
Motor coaches were in waiting after luncheon, and a projected tour was started upon; but after passing through Newton Abbot, it became evident that it would be useless to persevere, and advantage was taken of an offer to allow an inspection of the works of the Bovey Pottery Company, which proved highly interesting.

The return journey was by way of Shiphay Manor, the residence of Major Kitson, by whom the visitors were entertained at tea.

TORQUAY AND PAIGNTON GAS COMPANY'S HOLLACOMBE WORKS.

AN INSPECTION OF THE GLOVER-WEST VERTICAL RETORTS.

[The particulars and illustrations are from a specially prepared brochure.]



HOLLACOMBE GAS-WORKS FROM THE AIR.

The Torquay Gas Company was incorporated by Special Act of Parliament in 1860; further powers being obtained in 1865, 1878, 1894, and 1921. The Paignton Gas Company was established in 1859 and incorporated in 1894. The amalgamation of the two Companies was effected on Jan. 1, 1923, under the title of "The Torquay and Paignton Gas Company." Following the fusion of the two Companies, an extensive scheme of reconstruction was embarked upon, involving the centralization of manufacture at the Hollacombe Works. An 8-in. steel main was laid between the Hollacombe and the Paignton Works, and manufacturing operations at the latter works ceased entirely at the close of 1925.

In 1926 the St. Marychurch undertaking of the Torquay Corporation was acquired by the Company; but gas is still being produced at the St. Marychurch Works pending the completion of the extensions at Hollacombe.

The area of supply comprises the Borough of Torquay, the Urban District of Paignton, and the Parishes of Cockington, Collaton, Marldon, Stoke Gabriel, Kingskerswell, Abbotskerswell, Coffinswell, Ipplepen, and part of Stokeinteignhead.

EXTENSIONS AT HOLLACOMBE.

In December, 1924, it was decided to extend the carbonizing plant at Hollacombe by the installation in the first instance of Glover-West vertical retorts of a daily capacity of two million c.ft., with provision for further extension. The contract for this extension has now been placed, and work is in progress which will bring the total gas-making capacity up to three million c.ft. per day.

To cope with the increased quantity of gas produced, the purifiers are being extended to double the original capacity; the work being confided to Messrs. C. & W. Walker, and F.C. Construction Co., Ltd. The new purifiers will be of cast iron, with a ferro-concrete revivifying floor above.

The steam supply for the carburetted water-gas plant and other works purposes is being increased by the installation of

GENERAL VIEW OF HOLLACOMBE GAS-WORKS.

three new Lancashire boilers, 8 ft. in diameter by 30 ft. long, which are being placed in the old retort house.

GLOVER-WEST VERTICAL RETORT INSTALLATION.

The installation of Glover-West vertical retorts has been arranged on the site of one of the existing coal-store buildings, and, when complete, will comprise 48 retorts in six settings. Each setting is provided with a separate built-in producer; the eight retorts being heated in two units of four retorts each.

Coal-Handling Plant.

Coal is brought to the retort installation on railway sidings, running parallel to the retort house and coal stores, in wagons which may be of any of the 8, 10, or 12 ton sizes, and which are marshalled to and from the wagon tipper by means of an electric capstan with suitably disposed fairleads. The wagons are side-tipped in an electrically driven tipper designed and supplied by the Mitchell Conveyor and Transporter Company, and the contents are discharged into a coal-receiving hopper with a capacity of 12 tons of unbroken coal. This receiving hopper is provided with an outlet to a mechanical feeder for passing coal to the breaker, and with a compartment from which coal may be grabbed and distributed in the coal store by way of the telpherage system.

The coal breaker is of the West double-roll type, with heavily designed manganese steel claws capable of reducing 40 tons per hour of hard Durham gas coal to the size suitable for the carbonization process. From the breaker the broken coal is delivered by means of a steel guide chute and feeding trough to the buckets on the bottom strand of a West lip-bucket conveyor arranged transversely across the coal store. This conveyor elevates the coal and delivers it to the extended portion of the retort-house conveyor above the level of the coke-storage hoppers in such a manner that coal is fed to the retort bench without interfering with the transport of coke to the hoppers.

The coal is elevated from this point and distributed within the several compartments of the coal-storage bunkers above the retort bench. These bunkers have a capacity equal to 48 hours' supply of coal to the retorts.

The coal-receiving hopper is also provided with a by-pass chute, so that "nuts," small, or broken coal may be fed direct to the conveyors without the necessity of passing it first through the breaker.

Telpherage.

Along the full length of the coal stores, parallel to the railway sidings, is arranged a line of overhead track with a telpher machine designed and supplied by Messrs. Strachan & Henshaw. The plant consists of a truck tippler having a lateral discharge, and a telpher system for distributing the coal longitudinally in the store, at right angles to the direction of discharge of the wagons and parallel with the railway line. The level of the store is a little below the level of the railway siding; and at the point where the trucks are discharged, a small bunker was made which forms a convenient receptacle for the coal and for the housing of the breaker and the boot of the elevator which feeds the retort house hoppers.

The telpher line is 321 ft. long, and consists of a 14 by 6 R.S.J. having a renewable rail, 30 lbs. per yard, clipped to the top flange. The telpher line runs centrally above the storage ground at a height of about 44 ft. Near the centre of the line there is a semi-circular loop necessitated by the fact of the centre line of the hopper not being coincident with the centre of the coal store.

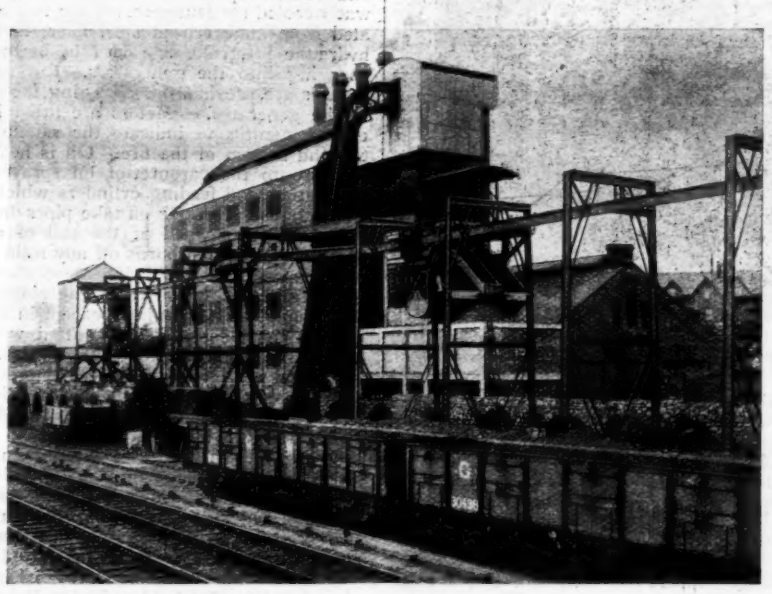
The telpher machine is Messrs. Strachan & Henshaw's high-speed top-rail standard type fitted with a Barnard grab capable of being discharged at any height by a special trip gear. This grab may be discharged right down on the coal heap, or at any desired height above. The hoisting speed is 75 ft. per minute, and the travelling speed 600 ft. per minute.

The motors are of "B.T.H." make, totally enclosed, weather-proof, series-wound for 220 volts D.C.; the hoist motor being of 18 B.H.P. and the travelling motor of 6 B.H.P. The plant is capable of moving the coal at the rate of 30 tons per hour.

Coal to be delivered from the railway wagons to stock is discharged into the receiving hopper, grabbed thence from the telpher machine, transported, and discharged into any part of the stores. Similarly, coal from stock is grabbed from the machine and transported back to the coal-receiving hopper, whence it is fed mechanically to the breaker or direct to the conveyor.

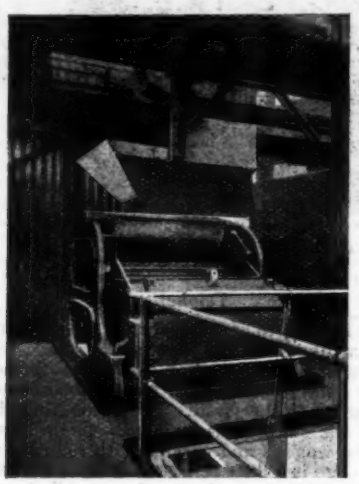
Coal Weighing.

An automatic weighing machine of Avery's hopper type is provided to weigh and register automatically all coal delivered to the bunkers of the retort house. The machine is arranged between the delivery end of the cross conveyor and the extended



THE INSTALLATION OF GLOVER-WEST VERTICAL RETORTS.

portion of the retort-house conveyor. It is provided with a steel weigh hopper of a capacity of 1 ton of small coal, weights of the Government pattern made up in units of 56 lbs. and enclosed in a dust-proof box, a substantial frame com-

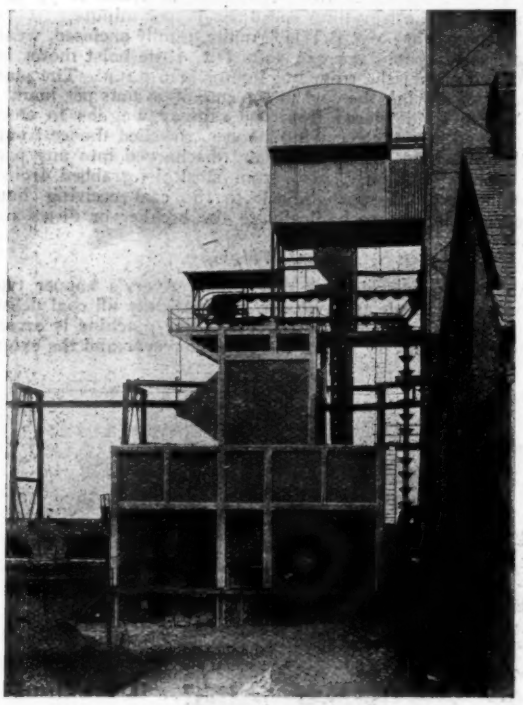


The Avery Weigher.

plete with double-armed weigh beam on knife-edges of specially hard steel with floating bearings, an adjustable compensating weight, and a mechanical counter.

Coke-Handling Plant.

From the coke chambers the coke is discharged about every two hours into a travelling chute, arranged to guide the coke direct to the buckets on the bottom strand of the conveyor running beneath the retort bench. This conveyor is capable of handling 70 tons of small coal and 30 tons of coke per hour. The arrangement of the two conveyors is such that coal can



Coke Hoppers and West's L.B. Conveyor.

be handled from the railway wagons on the siding to the coal-storage bunkers above the retort bench, and, at the same time, coke can be taken from the base of the retorts, elevated, and delivered to the coke-screening plant and storage hoppers. Coal and coke handling proceeds simultaneously, and it is never necessary to suspend coaling operations during the discharge of coke.

Coke Storage.

A battery of coke-storage hoppers has been arranged in close proximity to the gable end of the retort house. These hoppers were designed and constructed by Messrs. West's Rotinoff Piling and Construction Company. They are of reinforced concrete, and of sufficient capacity to accommodate 48 hours' make. They are supported on massive ferro-concrete stanchions at a height above the ground sufficient to enable road vehicles to manœuvre easily into position beneath the hoppers for filling from the slide doors in the bases of the several compartments. The hoppers are divided into three compartments receiving coke from the bar screen above the hoppers—the two end compartments for screened coke, and the central one for breeze. In addition to the slide doors, each compartment is fitted with a bag-filling chute to enable bags to be filled on a platform arranged along the full length of the hoppers at a height suitable for passing to the road vehicles without lifting.

Coke for the supply of producers and retorts is stored in a hopper within the retort house arranged to be filled direct from the retort-house conveyor and provided with an outlet and door to pass coke into a travelling skip on the producer feed runway. A secondary compartment in the same hopper is arranged to feed coke to a skip travelling upon the retort feed runway.

For facilitating access to the several platforms of the retort-house plant an electric lift is provided, designed by Messrs. Etchells, Congdon, & Muir.

Waste-Heat Recovery.

The waste gases from the retort settings pass into a collecting flue leading to a waste-heat boiler of the horizontal fire-tube induced-draught type, constructed on Kirke's patents by Messrs. Spencer-Bonecourt. Dampers and by-passes are arranged so that the waste gases from any setting may be passed to the boiler or direct to the atmosphere as desired. The capacity of the boiler is equivalent to the evaporation of 5600 lbs. of water from and at 100° C.; and when receiving the gases from all four settings, the boiler is capable of delivering 4450 lbs. of steam per hour at a pressure of 120 lbs. per sq. in. and a temperature of 230° C. Preceding the boiler, superheater tubes are arranged for indirect heating in the inlet products box. In addition to the usual standard fittings, the boiler is equipped with the "Thermofeed" and "Hilo" automatic feed-water regulator and water-level alarm, reducing the necessity of supervision to a very low minimum. The whole of the boiler and steam lines is heavily lagged.

All the mechanical portions of the plant are electrically driven by motors of the totally-enclosed dust-proof type. The power is generated alternatively by steam from the waste-heat boiler, or by gas. The steam-driven unit is coupled to a Browett, Lindley vertical steam engine, capable of developing 82 B.H.P. The gas-driven set is coupled to a Crossley horizontal engine capable of generating 86 B.H.P., running on town gas at a speed of 250 R.P.M. The dynamos are by the Lancashire Dynamo and Motor Company. The switchboard was designed and constructed by Messrs. Bertram Thomas.

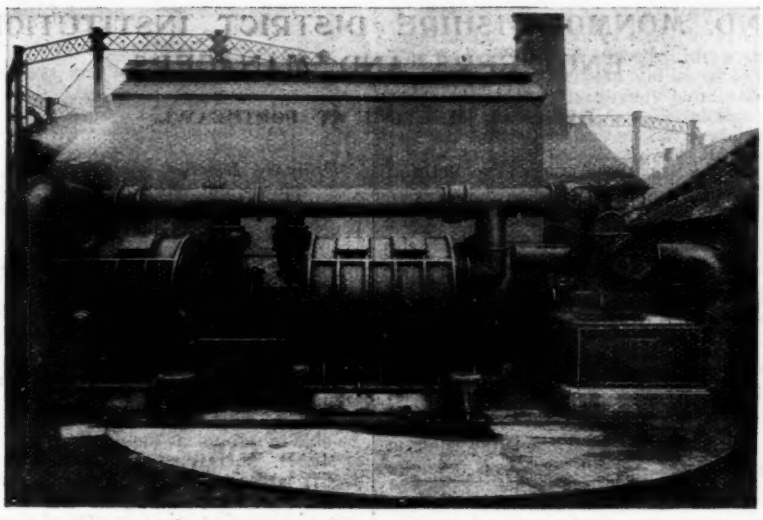
CARBURETTED WATER-GAS PLANT.

The carburetted water-gas plant, installed by Messrs. Humphreys & Glasgow, is in two sections, each calculated to produce 563,000 c.ft. of gas per day at a calorific value of 500 B.Th.U. The first section was installed in 1908 in the end of an existing retort house. It was arranged for future duplication, which was carried out in 1910. The original daily capacity of each section was 350,000 c.ft., but in 1922 the plant was remodelled by the makers, and increased to the present capacity.

Each set consists of a generator, carburettor, superheater, and combined washer and scrubber; and one multi-tubular water-cooled condenser serves the two sets. The plant is operated from an overhead steel floor, to which, by means of an hydraulic lift, coke is raised in barrows arranged for direct charging into the generators. Reverse-make valves and apparatus are provided for changing the direction of gas-making in the generator. Meters are fitted in the steam system of each generator to indicate the rate of flow of steam to the top and bottom of the fire. Oil is heated and delivered under pressure to the carburettor oil sprayers by means of special oil heating and feeding cylinders which dispense with oil-pressure pumps. The gas off-take pipes from the superheaters are automatically cleaned at the end of each "run" by means of an air jet, which burns off any solid matter which may have been deposited.

All the working valves of the plant are so interlocked that they cannot be manipulated except in safe and proper rotation; and all the blast valves are fitted with leakage vents which immediately indicate any leakage to the operator, showing him which valve is giving trouble and preventing the formation of an explosive mixture in the blast main.

Blast products scrubbers are provided, in which the blast gases from the plant are washed in a spray of water. The solid particles in the gases are thrown down by the water and settled out in a sludge tank at ground-level. Blast is provided by two centrifugal blowers, driven through reduction gearing by De Laval steam turbines. Each unit is sufficient for the two sections of water-gas plant, leaving one blowing unit always in reserve. Between the plant and the purifiers a "Cyclone" tar extractor is provided in the gas main from the plant to the relief holder, and a Pelouze-type tar extractor of special construction for dealing with C.W.G. tar fog is in-

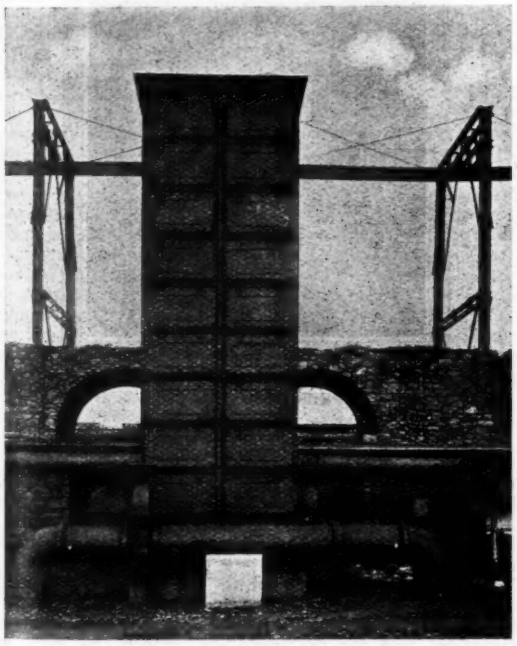


THE HOLMES WASHER-SCRUBBER.

stalled before the inlet to the purifiers, to protect the purifying material.

CONDENSING AND WASHING PLANT.

The water-tube condensers have been designed and supplied by Messrs. W. C. Holmes & Co., Ltd. They are of their "Super" type with horizontal tubes, and are built entirely of cast iron. The gas enters at the foot of the column, rises to the top, and descends on the other side of a central baffle plate. During both travels it is passing at right angles over the cooling tubes, which are plain-ended vertical cast tubes with lead socket joints into the tube plates. The cooling water makes an exceedingly large number of passes in the course of its travel through the successive tiers of tubes; and this high water velocity is a contributing factor to the efficiency. The all-cast-iron "Super" type of condenser is much favoured by engineers who are able to employ sea water for the cooling of gas, and it is also useful in the case of any water which is found corrosive to wrought-iron or steel tubes.



The Holmes Water-Tube Condenser.

The tar-extracting and washing plant comprises a Livesey washer, P. & A. tar extractor, and a Holmes rotary brush washer, arranged in series in the order mentioned. The Livesey washer is of the usual type, and is fed with liquor direct from the overflow of the rotary washer, thus ensuring true counter-current flow. The P. & A. tar extractor is of the Holmes columnless type. The rotary washer is of the Holmes "New" pattern, incorporating the patent Still chamber throughout. The filling is of the brush type, and the drive is by steam engine placed centrally between two halves of the washer, which is built in two units of five sections each.

A feature of the connections between the above three items of plant is that they are arranged entirely overhead, thus rendering drains and syphons unnecessary. The connections are steel-welded pipes with ½-in. steel flanges. This construction is particularly appropriate to the overhead arrangement, owing to its lightness and strength. The specials, such as bends, are die-pressed in halves and then welded up. The whole series is adequately provided with by-passes; and Holmes "Western" double-faced valves are employed throughout.

CARBONIZING RESULTS.

The results achieved during the half-year ended June 30 are indicated by the following figures:

Gas made	200,788,000 c.ft.
Make per ton	16,279 ,,
Therms per ton	81 therms
Fuel consumption	15·1 p.ct.
Coal carbonized:	
Wearmouth	11,533 tons
Rothervale	801 ,,

THE SMITH TAR EXTRACTOR.

A Simple and Efficient Device.

At the Shipping Engineering and Machinery Exhibition, which came to an end last Saturday at Olympia, Messrs. Hakol, Ltd., 115, High Holborn, W.C. 1, showed a most interesting apparatus for the separation of tar fog or tar mist from coal gas, water gas, producer gas, &c. This device, known as the Smith patent tar extractor, is extremely simple in principle. It consists of a closely packed but thin diaphragm of glass wool, through which the gas containing the tar mist is forced under a pressure of from 3 to 5 lbs. per sq. in. at a temperature best suited to allow deposition of the tar in a fluid form, facilitating its removal from the extractor by draining to a sump. The diaphragm is small in relation to the amount of gas passing; one square inch being provided for 200 c.ft. per hour of output, the thickness of the diaphragm being ⅝ in.

On passage through the glass-wool diaphragm, the minute particles of tar become coagulated by the combined action of turbulency and minute static electrical charges produced by the high velocity and friction of the gas through the minute voids between the glass fibres.

EFFICIENCY OF OVER 99 P.CT.

The Smith tar extractor is not in the ordinary sense a "filter," inasmuch as the tar is not separated on the surface of the diaphragm, but passes through with the gas, being coagulated into large drops, which fall out on the opposite side. In this manner the glass wool does not become choked, and does not require renewal except at long intervals. It is necessary, however, to ensure that solid particles, such as lamp black and free carbon, do not reach the extractor, as these, in combination with the tar, form a paste preventing passage of the gas. With this proviso, the Smith tar extractor, state Messrs. Hakol, Ltd., who are the agents and manufacturers, will continue to throw out the tar mist for long periods without intermission; a cleaning efficiency, under suitable conditions, of 99·5 p.ct. being obtained.

The extractors are made in sizes ranging from 4 in. to 20 in. in diameter on the diaphragm, and capable of dealing with 2500 to 40,000 c.ft. of gas per unit per hour. Many hundreds have been working for a long time in the United States; a notable installation being that at the works of the City of Cincinnati, where a battery of extractors is in regular use cleaning 8 million c.ft. of gas per day.

WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.

GENERAL MEETING AT PORTHCAWL.

Over sixty members of the Institution faced the Retiring President, Mr. A. T. KYLE, of Abergavenny, when the meeting of the Institution was called to order last Thursday, in the Council Chamber, Porthcawl. Those present included the Chairman of the Porthcawl Urban District Council, and other members, together with the Chairman of the Gas Committee, Mr. Walter Dunn (Secretary of the Institution of Gas Engineers), and Sir Paul A. Makins, Bart., and Mr. James A. Maclay (Directors of Messrs. R. & A. Main, Ltd.). Sir Paul Makins' father, it will be recalled, was for many years Governor of the Gas Light and Coke Company. The new President, Mr. D. W. DAVIES, of Tredegar, took the chair in the course of the proceedings.

WELCOME.

Mr. D. J. REES, J.P., M.B.E. (Chairman of the Council), offered the Institution a cordial welcome to Porthcawl, and expressed his pleasure at seeing so large a gathering. Congratulating the Institution upon having as one of its members the President of the Institution of Gas Engineers, Mr. Rees said that they in Porthcawl were very grateful for assistance that had been rendered them on more than one occasion by Mr. Madden, as well as by Mr. Octavius Thomas and Mr. Jackson. Some years ago the town took over the gas undertaking; and the gentlemen he had named had given them valuable help. They were making some progress; but the times were such that certain big schemes had to be postponed. Later in the day the members would have an opportunity of inspecting a highly successful attempt to increase the business of the Gas Department.

Mr. RUSSELL MARLEY (Chairman of the Gas Committee) associated himself with the welcome, which was suitably acknowledged by Mr. KYLE.

CONGRATULATIONS TO MR. MADDEN.

Mr. KYLE remarked that they were all delighted to have with them that day the President of the Institution of Gas Engineers—Mr. Madden—who had for so long been "one of themselves." This honour had been a great time coming to Wales; but at last it had come, and had been bestowed upon a gentleman who was in every way worthy of it. Their own Institution had on innumerable occasions had the benefit of Mr. Madden's advice; and now and then, perhaps, they had had a little criticism. But the thing about him that appealed most of all to them was his personality—his unvarying courtesy and kindness to all. They congratulated him upon being President; they congratulated the Institution of Gas Engineers upon having chosen him; and they congratulated themselves that he was a member of their own Institution. He hoped as many of them as possible would back-up Mr. Madden by attending the meeting of the Institution in Cardiff in June, 1928. He proposed that they offer to Mr. Madden their heartiest congratulations upon his appointment as President, and their best wishes for a successful year of office.

Mr. D. W. DAVIES (Tredegar) seconded the motion. The matter was, he said, one which they could not allow to pass unnoticed. Although their own Institution had been in existence for over 22 years, this was the first occasion on which the Presidency of the parent body had been bestowed upon one of their members; and if for that reason only, a record of the fact should be made. But there was a more important reason—namely, that the honour had been won by merit. Mr. Madden held the premier position in gas engineering in Wales and Monmouthshire; and, though a busy man, he was always ready to extend a helping hand to others.

Mr. H. D. MADDEN (Cardiff) said it was very nice to hear all these kind things; but what particularly pleased him was to hear the remark that he was "one of themselves." He hoped always to be so. The Presidency of the Institution was a very great honour; but he did not think he would have gone forward had it not been for Mr. Octavius Thomas, who had told him on several occasions that he must do so for the sake of Wales. Now that he had gone forward, he hoped the members of their Institution would rally round him, and carry the business to a successful issue.

THE MINUTES.

The HON. SECRETARY (Mr. Octavius Thomas, of Pentre) read the minutes of the last general meeting; and they were confirmed.

NEW MEMBERS.

On the proposition of Mr. W. COLLIN (Bridgend) seconded by Mr. D. MUIR (Pontypridd), the following elections were agreed to:

Ordinary Member.—Mr. Frank N. Oakley, Assistant Engineer and Works Manager, Merthyr Tydfil.

Transferred from Student to Member.—Mr. Edward M. Edwards, Assistant Manager of the Holyhead Gas Works.

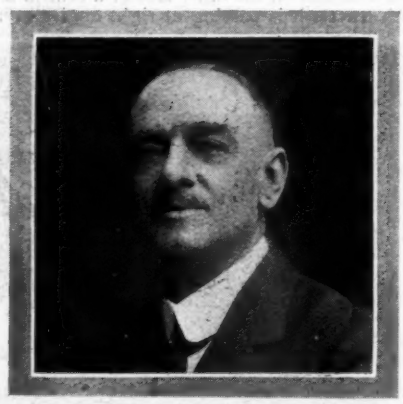
Student.—Mr. David Leyshon, Pontypridd.

NEW PRESIDENT AND THE PRESIDENT'S MEDALLION.

Mr. KYLE then asked the new President, Mr. Davies, to take the chair. He said the members had made a wise choice. Mr. Davies had taken a great interest in the Institution, and in committee work and other ways had put in a lot of time. He was doing very well in his own works, otherwise he would not be able to sell gas at the price he was charging.

Mr. D. W. DAVIES (Tredegar) then took the chair, amid the hearty greetings of the members. After acknowledging his cordial reception, he said his first duty was the very pleasurable one of proposing a hearty vote of thanks to the retiring President, Mr. Kyle, who had filled the office with ability, and had successfully maintained the high standard set by his predecessors. His Presidential Address was an example of the thoroughness he had applied to all his duties while in the chair; and the warm welcome which was extended to the Institution by the Mayor of Abergavenny last May was a very effective demonstration of the esteem in which Mr. Kyle was held in his own town.

Mr. W. H. JOHNS (Swansea) said that, as the proposer of the election of Mr. Kyle to the office of President, he was very glad



PRESIDENT, 1926-27.

Mr. A. T. Kyle, of Abergavenny.

to have an opportunity of seconding this vote, and of expressing to him personally the thanks of the members for the way in which he had carried out his duties during the past year. The visit to Abergavenny would long remain a pleasant memory to all of them.

The PRESIDENT then handed to Mr. Kyle the Institution's medallion, as a memento of his year of office.

Mr. KYLE returned thanks for the vote (which was passed by acclamation) and for the medallion, which, he said, would always remind him of an extremely happy time.

CERTIFICATES AND PRIZES FOR THE JUNIORS.

The PRESIDENT said they now came to what he regarded as one of the most interesting items on the programme—the presentation of the Higher Grade Certificates in Gas Engineering and prizes to members of the Wales and Monmouthshire Junior Gas Association. The Institution was doing all in its power to encourage education. He would ask the President of the Institution of Gas Engineers to make the presentation.

Mr. MADDEN then presented certificates and prizes as follows:

Higher Grade Certificates in Gas Engineering.

J. H. Williams, 1st Class, prize.
C. R. Monroe, ,, ,, ,,
L. L. Kleist, ,, ,, ,,
R. J. Williams, 2nd Class, ,,

For services rendered to the Wales and Monmouthshire Junior Gas Association.

C. Bateman, prize.
C. B. Felton, ,,
C. H. Collins, ,,
T. V. Blake, ,,

For having passed the following examinations:

Diploma in Gas Engineering.

E. M. Edwards, 2nd Class, prize.

Ordinary Grade in Gas Engineering.

Stanley Jones, prize.
J. M. Randell, ,,

Ordinary Grade in Gas Supply.

Thomas Huntley, prize.

City and Guilds of London Institute Examination in Gasfitting.

L. K. A. Cox, 1st Class Final, prize.
W. H. Evans, ,, ,, ,,
N. J. Wilson, ,, ,, ,,
L. Palfrey, 2nd Class Final, ,,
W. Bannister, Stage I., Pass, ,,
W. F. Garraway, ,, ,, ,,
J. F. Carless, ,, ,, ,,
J. H. Betts, ,, ,, ,,
T. E. Wiltshire, ,, ,, ,,

Cardiff Technical College (Internal Examination) in Gasfitting.

C. C. Wedlake, 1st Class, Stage III., prize.
R. R. Brown, ,, Stage II., ,,

Subsequently a clock was presented to Miss Dorothy Eaves, of Newport, who composed the "Hymn of Heat," in recognition of the good work done by her for the gas industry.

Mr. Octavius Thomas was also presented with two books—bought with the balance left over after the purchase of the gifts which, it will be remembered, were handed to him, as a token of the affection of the members, at the Abergavenny meeting earlier in the year.

Advice to Students.

Mr. MADDEN remarked that he would just like to say a word or two to the students. It had been a great pleasure to him to present the prizes which the Wales and Monmouthshire Institution had awarded them; and he congratulated the students upon their success. It was excellent to pass examinations; but he did urge them to bear in mind that this was not the end of their lives—it was the beginning. Their aim must be further, and still further, study. There was a great future for the gas industry; and for this they must prepare themselves. He himself in his time had witnessed huge development. He could remember when retort house machinery was quite an innovation—when hand stoking was everywhere to be seen, and when there was no carburetted water gas. Now they saw science applied to gas manufacture; and they had the vertical retort. If progress was to be maintained, it would only be by the continued application of science, not only on the works, but also on the distribution side—the consumer's service, which was their most vital point. Juniors must equip themselves to take care of the enormous developments which could be brought about in applications of gas. At times some of them might think that promotion was slow; but their chance would come, and they must be prepared to meet it when it arrived. They should be mentally equipped to take the place above them at a moment's notice; and this could only be brought about by boundless enthusiasm in their work and by study. The more they studied, the easier and more interesting it became. They should persevere with their studies, not only for their own sakes, but for the industry they served and the undertaking they worked for. They would be all the happier for doing this. But he would say that, important as were character forming and mental and bodily development, it was above all necessary that they should possess boundless enthusiasm.

The PRESIDENT said they were greatly indebted to Mr. Madden for his timely advice.

New Vice-President.

The HON. SECRETARY explained that Mr. J. E. Kenshole, of Merthyr, had, in order to fill a gap, allowed his name to go forward as Vice-President; but since that time the Council had been successful in their efforts to secure a substitute.

Mr. W. C. JACKSON (Neath) then proposed the election of Mr. B. Grainger, of Caerphilly, as Junior Vice-President. Mr. Grainger's known ability as an engineer satisfied them that he would fill the position with credit to himself and to the Institution.

Mr. A. G. LOFTHOUSE (Pontardawe) seconded the proposal, which was heartily agreed to.

Representative on the Parent Council.

On the motion of Mr. A. E. WILLIAMS (Cardiff), seconded by Mr. B. J. BELL (Cardiff), Mr. Davies was appointed to represent the Institution on the Council of the Institution of Gas Engineers for the year commencing in June, 1928.

Special Purposes Section.

The seventeenth annual report of the Special Purposes Section, which was signed by the Chairman (Mr. James E. Kenshole), stated that the Committee noted the small attendance of members at the salesmen's meetings, and expressed the hope that these meetings would be better attended in the future. The Committee also wished to draw the attention of members to the Education Scheme and its value to the juniors, as shown by the appointments already obtained. They trusted that the managers of the different undertakings would give every facility to their assistants and juniors to attend these classes.

Mr. MADDEN, in moving the adoption of the Committee's report and accounts, referred to the Education Scheme, and said that an Advisory Committee for South Wales had been set-up; and if students who were in any doubt as to what they should do would appeal to this Advisory Committee, they would give them every possible help. The great point was that those who were going to map-out a course of study should make their inquiries as to subjects, &c., at the earliest possible moment, and not wait until it was too late to be useful. He earnestly appealed to engineers and managers to give every possible facility to their juniors to take the courses at the various colleges.

Mr. J. MOGFORD (Cardiff) seconded the adoption of the report and accounts, and it was agreed to.

Support the Education Scheme.

Mr. MOGFORD said he wished, on behalf of the students, to thank the Institution for the handsome prizes that had been presented. These prizes encouraged the students to take the advice which Mr. Madden had given, with resultant benefit to the industry. During the two years that he (the speaker) had been in charge of the classes, he had had under him an excellent set of students. They were interested in their work; and the offer of the prizes put vim into the whole thing. Thus he hoped in the coming session to have larger classes than hitherto. In giving these prizes, they were simply casting their bread upon the waters; and in due time the reward would be forthcoming. He urged engineers and managers to do everything in their power to induce the members of their staffs to attend these classes at the recognized school, so as to equip themselves for the strenuous time which the industry had in front of it. If there was any difficulty in sending them to Cardiff, they should apply to the Committee, and get arrangements made for the students to attend classes nearer home. There was another reason why he was anxious that the industry should encourage this Education Scheme—especially in South Wales. The Cardiff Technical College had gone to considerable trouble and expense in inaugurating these classes; and the Cardiff Gas Company and their Engineer, Mr. Madden, had offered the students every encouragement. They had invited the class to go to the Cardiff Gas-Works whenever they wished; and when they had gone, every facility had been afforded them—even to the extent of opening-up plant and arranging for members of the staff to give the students all possible information on the particular parts of the work that they might happen at the moment to be studying. Few works, of course, would be able to do this; but he could assure the Cardiff Gas Company and Mr. Madden that the students thoroughly appreciated it. It was very necessary that they should push along with this Education Scheme, because in South Wales there was going to be considerable advance made by students in what he might term allied industries. There were the Treforest Mining Schools, in which students were taught all about coal and its carbonization. The Cardiff College had mining classes, and the Swansea College specialized in these subjects. Now, if the members of their own Institution did not encourage their juniors to come to the classes set-up for them, sooner or later they would be having the students from the other colleges he had named drifting into the gas industry.

Thanks of the Junior Association.

Mr. T. V. BLAKE (Cardiff) was prevented by pressure of time at the meeting from proposing a vote of thanks to the seniors on behalf of the juniors; but in the following letter to Mr. Octavius Thomas he voices the high appreciation of the Junior Association of the kindness of the Senior Institution in offering so many valuable prizes for the encouragement of the younger members of the profession:

> May I take this opportunity of expressing, on behalf of the Wales and Monmouthshire Junior Association, our sincere appreciation and thanks for the gifts presented to our members?
>
> It is particularly gratifying to us that we should receive these gifts from the hands of the President of the Institution of Gas Engineers—that gentleman being better known to us as Mr. H. D. Madden, Engineer and General Manager to the Cardiff Gas Light and Coke Company, whose enthusiasm caused the formation of our Association, and who has generously sponsored our proceedings from the time of its inception. We are happy to enter upon our sixth year as a vigorous and virile body, with the assurance of the wholehearted support and continued assistance of the Senior Association.

SERVICE TO CONSUMERS.

By W. CLARK JACKSON, of Neath.

At the Abergavenny meeting on May 19 last, Mr. Jackson presented a paper on this subject; but the discussion had,

through pressure of time, to be held over until the present meeting.

The paper will be found reproduced on p. 495 of the "Journal" for May 25, 1927.

Discussion.

Mr. J. H. Canning (Newport) said they could congratulate Mr. Jackson upon having presented them with a paper into which he had managed to condense all the material facts bearing on the subject of service. These matters were now being frequently discussed at meetings; but they would bear continued discussion, until the principles of service were thoroughly understood and appreciated in all quarters of the gas industry—not only in the engineering department, but right down from the chairman to the latest recruit. All must be made to appreciate to the full how much service meant in bringing about the success of the undertaking and the satisfaction of the consumer.

Question of Tone.—Answering the Telephone.

One of the most important points was that which the author had sub-headed "The Question of Tone." He showed how important it was that everybody connected with the gas undertaking should endeavour to do his best to give proper service to the consumer. It was a fact probably within the experience of all of them that very good business which had been worked-up carefully by some member of the staff had been completely obliterated by an ill-chosen word, perhaps, or something said in a wrong way, or a letter not written in the proper tone. This brought back to his own recollection a difficulty that he had experienced in this respect. He referred to the question of replying to consumers' complaints over the telephone. The staff and officials of a gas undertaking were, after all, only human; and they could all say that they were sinners in this respect from time to time. They had moments of irritation, moments when they were pre-occupied, and moments when they were exceptionally busy. It should not, in an undertaking of any size, be the business of everybody or anybody in the office to answer the telephone. It was not fair to the staff, who had their other duties to perform; and it might lead to a busy person giving a curt answer. Telephone duties should be properly allotted; and the person in charge of the telephone exchange should be somebody having a practical knowledge of gasfitting, who was competent, by putting the right questions to the consumer, to find out as far as possible the nature of the complaint. If this precaution were not taken, it often meant duplication or triplication of work; but with the required information in his possession, the man was able to take the proper tools for dealing with the trouble, thus saving time and avoiding further irritations of the consumer. Consumers did not like to have too many men sent to their houses; and, on the other hand, they objected to being neglected.

Lady Inspectors.

Another point on which he wished to touch was the employment of lady inspectors. He thought they might agree with what Mr. Jackson said—namely, that these ladies were exceedingly useful; and they could certainly approach the mistress of the house in a way in which a man could not. And he (the speaker) would further suggest that it was a very valuable asset to an undertaking to have a lady on the staff who was a thoroughly qualified cook—one who understood not only the cooker and its management and adjustment, but also how to cook upon it—and who could give advice to ladies upon whom she called regarding any difficulties that might have been experienced. He did not think that, as an industry, they had paid sufficient attention to this particular point. On the other hand, it seemed to him that there were not a sufficient number of ladies thoroughly well instructed in this matter to go round. Personally, he had had difficulty in finding them. This very suitable occupation for women should receive the attention of technical colleges and other institutions where domestic training was given. In Newport they had for some years a lady who carried out this work very efficiently. When, however, the war broke out, the Company were short of men, and she was drafted into the office in another capacity; and ultimately the usual thing happened—she got married. Since then they had not been able to fill her place. There was a splendid opening here for the right woman with the right training; but he said the "right woman." During the war the Newport Gas Company put on several women and girls for carrying out consumers' maintenance; and in view of the Company's experience, he would suggest very strongly that any member who might think of adopting a similar course should take great care that he did get the right women. The women he had treated the consumers in an off-hand manner, and so did not benefit the Company in the way that the right woman certainly could do.

Public Lighting as an Advertisement.

Mr. A. T. Kyle (Abergavenny) remarked that this was a subject which had been left untouched for a long time. They seemed to be satisfied if they had a good supply of gas to the meter, and to have lost sight of the fact that the gas-consuming apparatus must be in proper order. It was up to them to satisfy the consumer, and put right anything that might be wrong. A good many complaints were due to the bad condition of fittings which had not been looked after by the consumer or by way of maintenance. The whole point in Mr. Jackson's paper seemed to be to educate and satisfy the consumer; and if they did their part thoroughly, the consumer would be satisfied. A lot of the apparatus with which they had to deal was of very poor quality. If this could be done away with, they would be saved much trouble. At his place, he dared not think of lady inspectors. Good public lighting was most important. If people got a bad impression of the gas lighting outside, it was carried into their homes, and led them to complain when the smallest thing went wrong. Mr. Jackson said: "Inspectors carry receipt books with them; and the whole of this work, except in the cases of special large consumers, is dealt with on a strictly cash basis." Did he experience any difficulty in getting the money at the time when he did the job?

Explaining the Cooker.

Mr. A. E. Davey (Aberdare) quite agreed that all undertakings should, if at all possible, arrange for a lady inspector, particularly to look after the cookers. She should be thoroughly competent to explain the use of the cooker. He had a lady on his staff who was capable, when a cooker was sent to a new consumer, of going along and pointing out how to secure the best results from it. It was difficult for a small undertaking to go beyond this. He was doing his best to get people to have gas installed, by spreading the cost over a period. They got the cost down to the lowest level; but when the instalments became due, they were sometimes not paid. Circumstances might change. The consumer might be all right when he ordered the installation, but afterwards he might be thrown out of work. Therefore they had to exercise patience. It was a difficult problem. They tried, however, to be as courteous as was possible, to push their business as far as they could, and to exercise all discretion.

Competition.

Mr. B. J. Bell (Cardiff) said that one of the most vital factors in their business to-day was not the ordinary competition that one expected from (say) another commodity which would do the same work, but another type which reduced the consumption of gas. For instance, if a cooker was not thoroughly satisfactory to the consumer, there was the cooked meat shop, the fried fish range, and many other prepared foods. Of these commodities huge quantities were purchased, with the result that the gas business suffered in this way. The point which he wished to emphasize was that on the one hand they had the gas undertaking, and on the other hand there were the public, who were not interested in their commodity or in the apparatus supplied, except for the duty that was performed. In order that this duty should be performed in the best possible manner, therefore, it was necessary that the public should be very carefully considered. They should be so treated that their attitude towards the appliances would be one which would prove to be mutually satisfactory to the undertaking and the consumer. However good the organization might be, it must be remembered that oragnization was only the first step in the direction of service; and to be of any real use, it must be backed-up by an enthusiastic and well-trained staff, from the lowest grade to the highest. Such enthusiasm would do more than anything else to promote the interests of the undertaking.

Do Not Neglect the Appliances.

The author had pointed out that even when the best of appliances were supplied there was no surety that the consumer would be satisfied, unless other steps were taken. It was, of course, impossible to keep in touch with each individual consumer day by day, nor should it be required; but it was necessary to see that the appliances which were sent out were kept in such a condition that they would give satisfaction to the person who had to use them. They had no idea of the inefficiency of the average individual who handled household appliances, or of the ignorance of the average person regarding anything which needed any mechanical attention whatever. It was these people, who had no intention of putting forth their hands to set things right, that they had to look after. Thus there was a growing tendency to see that each consumer was called upon periodically, and that the satisfaction was given which was necessary for the good of the gas industry. In connection with tested apparatus—a very important matter—they were finding more and more that the sellers of these appliances were paying a great deal of attention to theoretical and careful tests. Much of the apparatus put upon the market was absolutely beyond question; but one must be careful, in considering theoretical tests, not to forget that the apparatus was required for actual domestic work. Many things were wonderful in the laboratory, but a hopeless trouble when they got on to the district.

Mr. Jackson's Reply.

Mr. Jackson said that for the five months ended August his output of gas had increased 7 million c.ft., and there had been a decrease of over 2 p.ct. in the unaccounted-for gas. This showed that service paid. It was, of course, most desirable, where practicable, to have one particular person in charge of the telephone. In reply to Mr. Kyle's question, he might say that he had had no trouble at all in getting paid for work done on a strictly cash basis. In addition to the actual sales which these girls secured, a great deal of business indirectly came through them to the undertaking. Since they were trained for the work, he had experienced an extraordinary development of his gas fire and cooker business. Calling periodically, they met the same consumers again and again, and could make useful suggestions, which in the end the consumer frequently acted upon. To give some idea of what had been involved in this maintenance scheme, he might point out that in the first year they spent over £1000 in cooker parts alone, for the repair of cookers which these girls had inspected. For his size of works, this was an amazing figure—certainly it was a surprise to him. One other point to be borne in mind was that the smaller defects were rectified before they grew to serious proportions. They had extended their scheme until they had now over 92 p.ct. of the consumers on their cards. In nine months these girls actually sold, and got paid for, 600 mantles, 105 burners, 200 globes, shades, &c., and 30 hall lamps with special fittings. This, he thought, was not a bad record for so small an undertaking. He wished to take this opportunity of expressing his thanks to his Assistant, Mr. F. Dupont, for having helped him in the preparation of the paper.

[In the paper as printed, the statement appeared that: "The inspectors are able to deal on an average with 35 consumers per day." This figure, Mr. Jackson said, should read "25."]

Present-Day Problems.

Mr. T. Anthony Canning, F.C.S., of Woking, had prepared a paper entitled "Present-Day Problems;" but time permitted only of his introducing it in a short speech. Mr. Canning, it may be mentioned, is a grandson of the first President of the Association.

The paper will be published in a future issue of the "JOURNAL."

Mr. MADDEN said he was sure he would be voicing the wishes of those present if he suggested that the paper should be brought forward again for discussion at the next meeting; for there were many points in it which should lead to a good debate. There was only one matter upon which he was inclined to disagree with the author, and that was with regard to the drawing of water gas and coal gas through a common exhauster. The author showed conclusively how important it was that they should "Use British Tar for British Roads." It meant a lot to South Wales, where they were so dependent upon coal. In the matter of coke, they had carried out in Cardiff very strongly the policy which Mr. Canning advocated. Might he say how pleased they were that Mr. Canning should have come forward with a paper for his parent Institution? He had gone to London now; but he was still a Wales and Monmouthshire man, and they hoped always would be.

The PRESIDENT seconded the proposition that discussion of the paper should be held over until the next meeting; and it was agreed to.

THANKS.

Mr. R. J. AUCKLAND (Cardiff), proposing a vote of thanks to the authors of papers, said he would have liked to support fully the remarks that had been made regarding Mr. Madden's election as President of the Institution of Gas Engineers; but he would content himself by saying merely that the position he had attained was one to which his qualifications fully entitled him. It was, indeed, inevitable that he should attain it in course of time. It might interest the members to know that the Cardiff Gas Company had induced the Penarth Urban District Council to go in for an improved system of public lighting, under which the whole of the lamps in their district would be replaced by an up-to-date type. When Mr. Bell had got through the work, the installation would be well worth seeing.

Mr. J. STEPHENSON (Ferndale) seconded the vote, which was carried unanimously.

On the proposition of Mr. J. H. CANNING, seconded by Mr. F. C. WHITE (Blaenavon), the Chairman and members of the Porthcawl Urban District Council and the Gas Committee were heartily thanked for the use of their offices for the meeting and for their hospitality.

PLACE OF NEXT MEETING.

Mr. D. W. BOWEN, J.P. (Chairman of the Tredegar Urban District Council), said he felt it a privilege to come to Porthcawl to support the Gas and Water Manager to the Council, who had now taken up the office of President. He was delighted to find they had chosen Mr. Davies for this position. He was the right man in the right place. It was now his pleasure to extend a hearty invitation to the Institution to visit Tredegar for their next meeting. They were selling gas there at a cheaper rate than any town in Monmouthshire, and making a good profit. At the same time they were selling water cheaper than any town in Wales. This was all due to their Gas and Water Manager, for whom he had the deepest regard.

It was agreed, on the proposition of the HON. SECRETARY, that the next meeting should be at Tredegar.

LUNCHEON.

This concluded the business of the meeting; and members and guests then proceeded to the Coney Beach Dance Restaurant for luncheon, on the invitation of the Chairman and members of the Porthcawl Gas Committee.

This was followed by a short toast list, in the course of which "The Wales and Monmouthshire District Institution of Gas Engineers and Managers" was proposed by Councillor D. J. Rees (the Chairman of the Council), who said that Porthcawl was making a great push ahead. Their slogan was "Gas for Everything;" and they did not think that electricity was going to affect their gas undertaking. Councillor W. J. Griffin (the "father" of the Council) supported the toast, which was responded to by Mr. A. T. Kyle, who declared that efficiency of service was the aim of the Institution. He thanked the Council for their hospitality. Mr. Octavius Thomas also responded, remarking that gas was progressing on its merits.

Sir Paul A. Makins, Bart., having presented to Mr. T. B. Walker the cup won by him in the previous day's golf competition, Councillor D. M. Parry-Evans submitted "The Visitors." He said that he was responsible for the introduction of a Tully gas plant at Porthcawl, at a time when they were in serious trouble. Now, he was thankful to say, they had got over these difficulties. The response was by Sir Paul Makins, Mr. H. D. Madden, and Mr. James A. Maclay.

Mr. J. H. Canning proposed "The Porthcawl Gas Undertaking." While, he said, it must be admitted that gas could not do everything, neither could electricity. He did not think electricity was likely to seriously compete with gas in the fields in which gas was pre-eminent—namely, cooking and heating. He believed that the Porthcawl gas undertaking was making excellent progress under the very able management of Mr. S. Walker. In the case of a health resort like Porthcawl, the gas undertaking was one of the greatest assets. In the course of his reply, Councillor J. E. Williams, as ex-Chairman of the Gas Committee, paid tribute to the excellent work that the present Chairman of the Committee had performed. The Chairman of the Committee now is Councillor Russell Mabley; and he also responded to the toast.

After luncheon, there was an official visit to the gas exhibition which was being held in an adjoining hall.

GOLF COMPETITION.

The Institution's golf competition, medal play, was held on the day preceding the meeting at the Pyle and Kenfig Golf Links, Porthcawl. Eighteen took part; and Mr. T. B. Walker won the cup. The following were the highest scores:

T. B. Walker	92 − 14 = 78
J. Sadler	92 − 13 = 79
J. Prosser Jones	97 − 17 = 80
E. S. Allen	94 − 14 = 80

ENTERPRISE AT PORTHCAWL.

The exhibition which the members of the Institution officially inspected during the afternoon of the meeting was a Model Homes, Trades, and Gas Exhibition, staged in the Coney Beach Pavilion, and remaining open from Sept. 19 to 24 inclusive. It was formally opened by Mr. H. D. Madden, M.Inst.C.E., who complimented the organizers upon the fine display that had been got together. Mr. Madden was supported on the occasion by the Chairman and members of the Council and by prominent members of the gas industry in South Wales.

It was an exhibition promoted by the Gas Committee of the Porthcawl Urban District Council (mainly through the instrumentality of the energetic Chairman of the Committee, Mr. Russell Mabley, who threw himself wholeheartedly into the scheme) with the view of developing the sales side of the undertaking, which was acquired by the Council from a company in 1916. Since the Council have had control of the undertaking, there has been no exhibition of the kind in Porthcawl; and this first effort was successfully made in conjunction with Mr. A. G. Barry, of Messrs. R. & A. Main, Ltd. It was well supported by prominent firms connected with the industry, and other South Wales business houses; and the attendances throughout the week constituted a record for anything that has yet been staged in the town. Various attractive features were arranged; but none proved a greater "draw" during the whole of the week than the cookery demonstrations, with a "Conservor" oven, of Miss M. K. Gompertz, M.C.A., who had the gratification of finding the accommodation placed at her disposal severely taxed on every occasion. The arrangements generally were well calculated to secure large patronage. For example, there was a special ladies' day, when over a thousand women from Porthcawl and district visited the exhibition. Then another afternoon was devoted to an inspection by the elder children of the Porthcawl schools. There were mannequin parades prepared by leading firms, and other items on the programme which no doubt largely helped to entice the housewives who thronged the pavilion to come and learn about gas.

The Gas Committee are extremely pleased with the results of the exhibition. It is estimated that, as a direct outcome, the demand for gas and modern gas appliances will be increased by at least 25 p.ct. The lay-out was highly creditable; and on all sides there were expressions of congratulation to those who had organized such a successful event. The exhibitors, too, expressed themselves as perfectly satisfied with the amount of business done; and some of them have already booked space for an exhibition of the same character at Porthcawl next year. The Gas Manager, Mr. S. Walker, who has served the Council since the undertaking was acquired by them, was prominently associated with the organizing of the exhibition; and it was recognized that to him and to his staff great credit was due for the enthusiasm and effort that was put into the work.

The building in which the exhibition was held is reputed to be the finest along the Welsh coast. It is 275 ft. in length and 66 ft. wide, and is divided into three halls.

THE EXHIBITS.

Facing the entrance was a picturesque little snow scene, bearing the exhortation "Order your fires before winter comes," and featuring Main "Cinderella" and other fires. The Gas Department stand was run in conjunction with Messrs. R. & A. Main, Ltd., of London and Falkirk, who showed various styles of heating and cooling apparatus—including the first example to be shown anywhere of their all-enamelled cooker, with "Conservor" oven and "Mainstat" regulator. The appearance of these cookers, which are being made in several sizes, will satisfy even the most difficult to please.

Messrs. Thomas Glover & Co., Ltd., had an exhibit illustrating the manufacture of gas meters, with a general display of meters, meter parts, flash signs, and street lamps. An item of interest here was a dry meter made by the firm in 1844, which is still registering correctly, and has never been repaired. Interest was also attracted by a very effective gas fan in operation on this stand. This fan, of which Mr. R. Murray Wight is the inventor, is made by the Model Engineering Company, Ltd., of 8 and 10, Addison Avenue, Holland Park, W.

Messrs. W. H. Dean & Son, Ltd., drew attention to the

"Dean" and the "Gainsboro'" gas washing boilers—the latter with an outside casing stove enamelled in various colours. Electrolux, Ltd., showed the "Household" and the "Kitchen" models of their refrigerator.

Messrs. Ewart & Son, Ltd., showed all kinds of geysers connected-up to lavatory and bath. Messrs. Falk, Stadelmann, & Co., Ltd., had a good selection of fittings, shades, mantles, &c. Messrs. Fitt Bros. & Davies (1924), Ltd., Swansea, exhibited an Evans reversible piston valve tar pump, and also Hayward-Tyler pumping machinery. Another stand was that of Mr. T. S. Hall, Bristol, who makes flue pipes and gas water heaters. The Western Engineering Company, Ltd., Swansea, specialize in pumping machinery. They displayed Keith fans and Keith gas irons; while five Keith high-pressure lamps for lighting one end of the hall were operated from here.

An excellent show of bye-products, vegetables resulting from the use of sulphate of ammonia, &c., was loaned by the Cardiff Gas Light Company.

A STUDY OF THE PHENOMENA OF ELECTROLYTIC CORROSION OF MAINS.

By A. BOLZINGER, Ancien Elève de l'Ecole Polytechnique, Chevalier de la Légion d'Honneur.

(*Concluded from p.* 629.)

DRAWING-UP A CHART OF STRAY CURRENTS.

The necessity has already been pointed out of knowing the habits of stray currents which may be looked upon as permanent, and, so to speak, normal. Primarily this will enable one to determine the danger points and to get electricity undertakers to modify their distribution systems. Secondly, it will enable one to verify periodically that things are in the same state as previously, and that no new factor has come into play.

What we are now proposing is in all ways analogous to the drawing up of a chart of pressures (isobars) in the case of gas distribution; such a chart serving to disclose the weak points and modifications needed to strengthen them. Then, once this chart has been prepared, by measurements taken from time to time at judiciously chosen points, one can see if the normal pressures vary; if they do, one can conclude that accidental obstructions have come into existence, which should be remedied immediately. Indeed, it amounts to applying the rational and excellent rule of forestalling events instead of leaving them to surprise and overwhelm one.

The only means of obtaining the chart is to carry out series of tests over the whole system of mains; and the first series of operations is as follows:

(1) Determine the potential difference between the main gas rising pipes and the tramrails. This operation can be carried out anywhere by measurements between the pipes and the rails; and it will give information of the track of the current from the rails to the pipe, or *vice versa*.

(2) Determine the potential drop along the pipes by a measurement between two rising pipes situated about 200 metres one from the other. This indicates the direction of the current in the pipes. The current may originate from the tramway or from defective wiring systems.

(3) Determine the potential difference between the pipes and any known works belonging to other services (electricity, water, telegraphs, telephones, &c.), still taking measurements between the rising pipes and these works.

It will be observed that these measurements are characterized by the fact that they can all be made without the main pipe, or whatever it is, being uncovered; the operation being therefore very simple. In addition, one can measure the potential difference between the rising pipe and the ground or between two points in the ground; but these measurements, as we have seen, cannot be relied upon.

The second series of operations should include all possible measurements taken in the trenches when the conduits are uncovered (potential differences between the pipes and the rails, electric cables and their coverings, water mains, telegraph and telephone cables, &c.).

Each measurement of potential difference should be observed over a certain time which should vary according to results given. If the potential difference shows but small variation, the test should last five or ten minutes. If it varies greatly, the test should last much longer and the variations should be plotted on paper. One might even extend this test over twenty-four hours, using for the purpose a recording voltmeter. As a matter of fact, the variations in potential difference depend to a large extent on the running of the machine which produces the stray current; and it is possible by studying them to fix upon the origin of the currents (whether from the tramway system or from the town mains).

The various results of these tests will now indicate the zones of entry and departure of the stray currents, and their direction of flow in the pipes—that is to say, their "general habits." The knowledge may then be completed by measurements of intensity which should first be carried out in the zones which appear the most interesting. One should also attempt to analyze samples of earth, and note the results as well as definite cases of corrosion.

It is advantageous to collect all these readings on one or more charts of the district—in fact, this is indispensable for practical purposes.

ACTUAL PRODUCTION OF THE CHART.

The first thing to be done is to mark on the chart the following information:

(*a*) Situation of the tramway power stations, and the course taken by the return feeders, and their junctions with the track (the main circuits may be equally interesting as sources of stray currents if they are underground cables).

(*b*) The situation of other generating stations, together with zones of alternating and direct current and information as to the cables (aerial or underground).

Measurements of potential difference should be made in the following order:

(1) Between pipes and rails over the whole system of tramlines, since that is the chief source of stray currents. In the event of these measurements indicating the existence of current in a particular pipe, further measurements should be taken between two points of the latter.

(2) Between two points of pipes lying near underground direct-current cables or tramway feeders.

(3) Between pipes and other uncovered underground works, water, telegraph and telephone cables, electric cable covers, &c., when trenching discloses them.

GRAPHING THE RESULTS.

It will usually be more advantageous to draw up three different charts. The first should show specially the measurements made between pipes and tramrails and between two points in the pipes; and this chart will be the most interesting. The second should relate to potential differences between gas mains and other subsoil works. On the third chart, one should collate the information furnished by the other two, limiting the indications to the bare figures necessary.

Graphically, potential differences may be indicated in the following manner. Where the point under examination appears on the chart, the measured potential difference* should be marked as a perpendicular to the main—to the scale chosen. The plotted points are then joined by a line, and the positive and negative potential differences are indicated by shading the areas (fig. 6). As for the direction of flow of the current in the

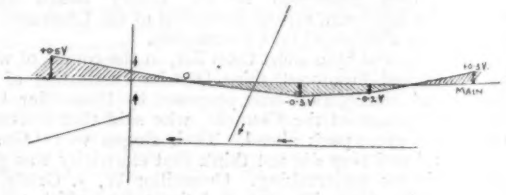


Fig. 6.

pipes, as determined by measurements between two points, this is indicated by arrows.

INTERPRETING THE MEASUREMENTS AND THE STRAY CURRENT CHART—PERIODICAL TESTS.

Up to this point, we have only dealt with the measurements; and these have to be interpreted. It is difficult to prescribe a general rule—most often the method must depend upon the local circumstances. However, the following may be of assistance.

The first thing to be done is to establish what currents are due to accidental defects in the electrical system. While the measurements are being taken, most likely there are in existence certain defects which must be forthwith notified to the electricity producers, so that they can make them good; and at the same time one can take whatever steps are desired to protect

* In all that follows, potential differences are given as related to the pipe—that is to say: conduit potential – earth potential. If the potential is positive, the current will pass from the conduit to the earth (danger zone).

the pipelines. Thus it will be seen that in the first instance one must determine these accidental currents and distinguish them from organic or permanent ones—at the same time hoping that they will be checked by their authors as soon as they are notified. Unfortunately, permanent currents are due to the general working of the system (tramways or town mains) and not to accidents.

As we have already seen, traction systems employing a non-insulated rail as the return conductor are practically alone in giving birth to these permanent currents; whereas the accidental ones may originate either from the town mains or from the tramways if defects exist. This emphasizes the advantage of distinguishing the traction currents from those produced otherwise.

Now, it has been pointed out that the first job is to determine the potential of the pipeline in relation to the tramrails. This will give us the zones of entry and departure of the current in our pipes; and we can easily deduce the direction of flow in pipes which follow the rails as well as in those in neighbouring streets which are likely to pick currents up. As regards the latter derivations, it is known that a current will always seek to follow the line of least resistance; and the resistance depends both on the length of the pipe and also upon its nature (the resistance of the joints and the pipes themselves is involved). We must therefore follow up possible tracks and trace the current by appropriate measurements.

Here, by way of example, are a few likely cases.

Example 1.—Pipe 1 (fig. 7) is always negative to the rail, so

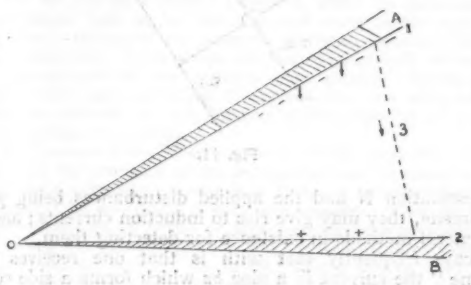


Fig. 7.

the current flows from rail to pipe. If pipe 2 is positive, one can suppose that a flow exists from pipe 1 to pipe 2 through pipe 3. One will therefore seek for the current in pipe 3. If V_1 and V_2 are the potentials of rails 1 and 2 relative to point O, and v_1 and v_2, the rail-to-pipe potential differences, the potential difference between A and B is—

$$(V_2 + v_2) - (V_1 - v_1) = V_2 - V_1 + (v_2 + v_1)$$

Thence one can form some idea of the strength of this current, and verify it by measurements in the main 3.

Though the current, in general, will return by choice direct to point O, the following may prove to be the case. It may be established that pipe 2 is normally negative, but that at certain times, particularly when there are no trams on the line, its polarity changes. This change will often be due to the influence of pipe 1, being transmitted through pipe 3.

Example 2.—If abnormal changes of polarity are discovered in a pipe, it is generally due to the discontinuity of the rail or the pipe. In such a case as fig. 8 represents, the current pass-

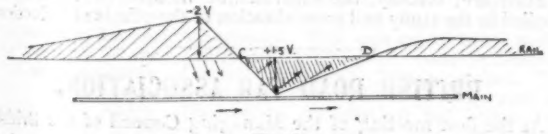


Fig. 8.

ing in the pipe near the gap C assumes an exaggerated importance; and although the pipe generally is negative between C and D, it may abnormally be found positive. If the pipe is resistant at a point C (fig. 9), there will still be a change of

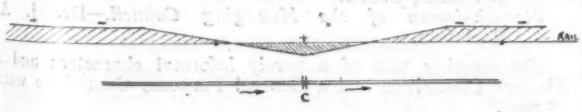


Fig. 9.

polarity; but the potential difference before the point C will not assume the exaggerated value which it had in the former circumstances.

These two examples illustrate how one must try to interpret the measurements.

Having, then, determined what currents are attributable to the tramway system, any others found will be laid to the charge of the town distribution system. In certain areas, of course, currents cannot possibly be due to the tramways; but where the possibility exists, they may be recognized by their wide variations, which are brought about by the passage of the trams themselves. As a general rule, in every case where the tramways are suspected, it will be useful to examine the pipe-to-rail potential difference, since, when dealing with other sources, all one has to go on is the potential difference between two points in the pipeline.

Here, now, are some useful figures. Damage may be feared in the following cases: (1) When the potential difference between rail and pipe amounts to + 1 volt (pipe positive relative to rail) or −4 volts (pipe negative to rail). (2) When the potential difference between two points 200 m. apart on a pipe amounts to 100 millivolts. These figures are by no means intended to be absolute, especially as we know that it is the intensity, not the voltage, of the current which is a measure of the danger; nevertheless, they may be relied on in first approximations.

Periodic Tests.

We have, then, shown how the chart is interpreted. We have dealt with accidental currents; marking them down and noting their origin. We have similarly accounted for permanent currents which can be diminished only if the tramways modify their systems by the addition of feeders, &c. Possibly our work will induce them to take the necessary measures. In any case, we know the danger points; we can take stock of the situation; and we can make frequent tests for escapes.

But this is not all; we must continually assure ourselves that things remain as they are, and that new accidental currents do not appear. It is here that the chart assists in maintaining supervision, for if any alteration in the general habits of the currents appears, whatever its direction, it is due to an accident in the town or the tramway system.

The supervision is a necessity, and must be carried out by measurements and tests at frequent intervals. Careful supervision, however, cannot mean doing over again all the measurements which were involved in producing the chart—this would take too long, and thus be of little use. One must fix upon certain points at which measurements taken would be characteristic of the normal state of the stray currents; and the selection of such points will be a delicate job, depending upon one's experience with the system generally.

It would appear that of first importance are the points where tramway return feeders are connected, and the environs of the power stations. This is because, if stray currents increase in the system, it is through these points that they will make their way back to the generator; and, consequently, it is here that one has the best chance of noting any anomalies. Certain points which appear to be sources of many stray currents will be selected along the tram tracks. The ends of the track are of interest, for if abnormal resistance is established anywhere along the line, the current leaving the rail at the ends will be increased in value. It should be noted that the current is generally stronger on gradients. For consideration at the same time, pipelines lying near the most important town distribution cables should be subjected to periodic supervision.

The points where stray currents are in permanent existence must, then, be supervised; but those where normally there is none must also be included, as a mishap may quite well originate them. Our choice of points, however, should not be guided solely by this consideration—we have already recommended that supervision should extend over whatever may produce stray currents (rails, electric cables, &c.) and over the return path of these currents.

In practice, one can provide the mains with contact points (insulated wires, soldered to the pipe and brought to the ground level in a syphon trap) which will facilitate measurements. Such an arrangement will be analogous to taking pressures on a gas district.

2.—Technical Inquiry.

We have now seen how to maintain supervision of the system. Such provision cannot in every instance put a stop to permanent organic stray currents; further, some defect in the supervision may exist. Anyway, we will suppose that electrolytic corrosion takes place. One must then seek for and determine the responsible person; and this is the object of the technical inquiry.

The first means to employ in the technical inquiry are the same as were used for the drawing-up of the stray current chart and supervision of the currents. All possible measurements of potential and intensity will be taken; and one should attempt by chemical analysis to prove that the corrosion is due to an electric current, by methods which we have seen in Part I. Finally, one should draw up a chart of the currents in the zone under consideration. In this, one can make use of the chart which has already been established, for there will be found a collection of data which will probably result in quickly bringing the technical inquiry to a successful end.

Having demonstrated the culpability of electricity, it still remains to discover which actual undertaking is concerned. To this end a study of the variation of potential and intensity of the stray current at the time will be of assistance. We have already pointed out the relations which exist between these quantities and the running of the guilty system; the relations being revealed to some extent by the time-table and the service of trams or by the peak hours of distribution of electric energy.

It is essential on occasions to study these variations with the help of a recording apparatus.

Worthy of note, too, is a method explained by M. James Chappuis, in a paper before the Société Technique du Gaz (45th Congress, June, 1922), from which we have extracted the following.

The movement of the commutator of a dynamo across the brushes produces a discontinuity in the current, which one should be able to hear in a telephone receiver. The number of vibrations is N, the product of n sectors of the commutator and n^1 revolutions per second. This weak alternation N is reproduced in the current and is characteristic of the particular dynamo; and it is interesting to amplify it.

For this purpose, one can employ a sound amplifier such as is shown in fig. 10. The stray or derivation current is con-

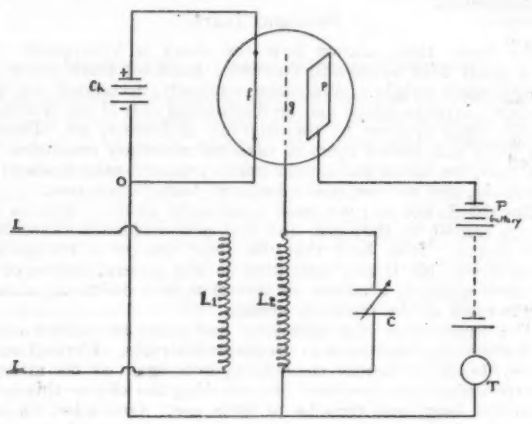


Fig. 10.

nected by leads L and L^1 to the primary (1) of an induction coil, the secondary (2) of which forms part of an oscillating circuit (LC) imposed on the grid-filament circuit of a three-electrode valve. The inductance (L) and the capacity (C) may be varied at will, with the result that one can tune the frequency of this circuit to the frequency N of the reception.

Now we know that the periodicity of such a circuit is given by Thomson's formula

$$T = 2\pi \sqrt{L.C} = \frac{1}{N}$$

The plate p of the valve is connected to the positive terminal of a battery of about a hundred cells; and a telephone T is fixed on the filament-plate circuit. "Ch" is a battery for heating the filament f.

The oscillations N of the inducing current result in potential variations of the grid; and thus variations in the intensity of the filament-plate current are set up corresponding to filament-plate variations of potential. Hence variations of potential occur at the poles of the battery P which provides the required energy.

The sound N will be heard in the telephone; and it may be selected and amplified by adjusting L and C. It is then necessary to measure N, in order to compare it with the product nn^1 which characterizes the generator, and confirm the origin of the current. The determination of N is effected by means of a heterodyne made for the purpose, capable of reproducing sounds of 400 to 4000 vibrations per second; these being the limits within which it has been found that normal dynamo "noises" are included.

For the lay-out, calibration, and use of this installation, reference is made to the paper of M. Chappuis.

The method appears to the author, however, to allow a loop-hole, inasmuch as, on the district being surveyed, there may be several generators giving readings N differing so little as to cause confusion. In such a case, one may superimpose on the main generator current electrical disturbances which should be substantially of the same magnitude as the waves which produce the sound N, so that they can be picked up by the telephone receiver as easily as the others.

In order to do this, one obviously cannot march into the station suspected of containing the guilty dynamo, and apply to the shaft some fitting whereby these electric impulses may be produced in the current. Again it is the three-electrode valve which is the essential feature; and the arrangement is shown in fig. 11.

V is a buzzer, and M a Morse key. When the key is depressed, there is produced, through the medium of coils 1 and 2, variations of the grid potential, and consequently of the filament-plate potential. These variations will be transmitted to the terminals of the main energy source—the dynamo D. The disturbances can, however, in no way upset the running of the dynamo, since the circuit is broken in the vacuum of the valve. When the filament is heated, it is merely the passage of electrons between the filament and the plate which causes the potential variations at the dynamo poles.

The receiver and amplifier described above being placed in shunt circuit with the line, the sound N of the dynamo and the signals from the Morse key will be heard together. The signals should also be distinguishable in every current derived from the main circuit, and thus in every stray current to which it may give rise.

One must also give attention to induction currents, which, as we have seen, may be superimposed upon conduction currents.

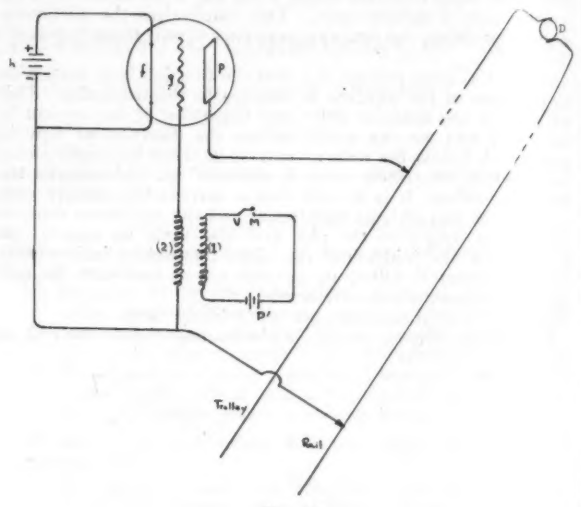


Fig. 11.

The oscillation N and the applied disturbances being periodic phenomena, they may give rise to induction currents; and there are general methods in existence for detecting them.

A case frequently met with is that one receives in the "phone" the current in a pipe *be* which forms a side common to the figures *abef* and *cbed*, which are subjected to the action of an inductor parallel to *ab* and *be*. If the induction phenomenon is involved, the induced currents are at any instance equal and of opposite signs in *be;* and their effects cancel out as far as the "phone" is concerned. The induced current, if it exists, can be detected by cutting-in, for example, at a point in the section *ef*.

Further, it is always possible to neutralize a primary or an induced current by a current of the same nature but out of phase by π. Since they have the same periodicity, it is sufficient to regulate them to the same intensity—their vectors are then equal and opposite. On the contrary, an induced current cannot be neutralized by a primary current, or vice versa, because the two kinds of currents are out of phase by $\frac{\pi}{2}$; their vectors thus being perpendicular to each other, and having equal resultants. The result is that they produce sounds of the same intensity on the inversion of either of them. On this observation may be based a method of recognizing the presence of a primary or an induced current, and of neutralizing the latter.

Such are, broadly, the experimental methods which may be applied in the study and neutralization of the effects of induction.

BRITISH ROAD TAR ASSOCIATION.

At the first meeting of the Managing Council of the British Road Tar Association, held on Sept. 20, the following appointments were made:

President.—Sir David Milne-Watson, LL.D., D.L.
Vice-President.—Mr. H. C. Head, M.Inst.C.E., M.I.Mech.E.
Chairman of the Managing Council.—Mr. W. J. U. Woolcock, C.B.E.
Vice-Chairman of the Managing Council.—Dr. J. A. Roelofsen.

The meeting was of a purely informal character; and a Finance Committee and a General Purposes Committee were formed.

Training in Domestic Science.—The extent of the facilities now being provided for girls for training in domestic science may be judged from the fact that, in one northern city alone, the progressive Education Committee has had no less than 62 of its schools equipped with gas cookers, irons, and water-heaters. The current issue (No. 163) of "A Thousand-and-One Uses for Gas" contains particulars and photographic illustrations of equipment in domestic science classrooms in various parts of the country.

INSTITUTION OF PUBLIC LIGHTING ENGINEERS.

Proceedings at the Fourth-Annual Conference at Brighton—continued from last week's "Journal," pp. 682-688.

ANNUAL DINNER.

On Tuesday evening, Sept. 13, the Institution had their annual dinner in the Banqueting Room of the Royal Pavilion, Brighton—when Mr. ALEX. C. CRAMB, Borough Electrical Engineer of Croydon (the President), was in the chair, and was strongly supported by distinguished visitors and members of the Institution. Following the Loyal Toast,

Councillor ANTHONY OATES (ex-Lord Mayor of Newcastle-on-Tyne) proposed "The Institution of Public Lighting Engineers," and congratulated the President upon his election to the high office to which he had been called. They were all proud of the late President (Mr. R. Davison, Public Lighting Superintendent at Newcastle). He (the speaker) had watched the Institution since its inception, and had helped in every way he could, with the knowledge that it was worthy of all the assistance it could get. The Committee and the Hon. Secretary (Mr. W. J. Liberty) were deserving of the warmest congratulation upon the excellent work that had been done by the Institution during its existence. The membership now stood at 138, which was a marvellous result, considering the short time the Association had been in existence. It showed clearly that a great amount of hard spade work had been accomplished; but there were still many members to be brought in. The Secretary was now in a position to give practically his whole time to the work of the Institution; and he (the speaker) hoped the executive would not forget that he was an honorary secretary, when the time came for them to honour him as he had honoured them in the work that he had done. He urged the members to try to influence others to join the Institution. They should not rest content until all the main roads and by-ways of the country were properly lighted-up for motorists, who were providing the money for new road making, and also, he claimed, for the lighting which ought to be installed when the roads were made.

Mr. R. DAVISON (Past-President), with whose name the toast was coupled, said the members of the Institution could certainly do good work, if their councillors would help them. Councillor Oates had told them that he was proud of him (the speaker). Well, he wanted Councillor Oates to be proud of him, because he would shortly be coming along for about £12,000 for improvements. [Laughter.] If they wanted to increase the lighting of the streets, they needed assistance; and they could only obtain this assistance by gaining the confidence of the committees they served. In Newcastle they had a lighting rate of 4¾d.; and one could not expect to light streets efficiently on such a contribution. It must be remembered that if people would not pay the money for lighting, they would have to do so for extra police, accident wards, &c. He felt certain that the Institution was going to do a lot for the future lighting of this country.

OTHER TOASTS.

Councillor H. J. THWAITES (Mayor of Bournemouth) submitted "The Corporation of Brighton," and in the course of his remarks expressed admiration of the labour-saving devices which he had that afternoon seen at the Portslade Works of the Brighton and Hove General Gas Company.

Councillor J. LORD THOMPSON (Deputy-Mayor of Brighton) replied; and then Councillor H. J. GALLIERS (Chairman of the Brighton Electricity Committee) proposed the toast of "The Visitors," which Mr. C. S. SHAPLEY (Leeds) supported.

In reply, Mr. H. D. MADDEN (President of the Institution of Gas Engineers) pointed to the number of important organizations which were represented at the conference. Mr. Shapley (a Past-President of their Institution) was on the Council of the Institution of Gas Engineers; Mr. C. H. Rutter (Engineer to the Brighton and Hove Gas Company) represented the Institution of Civil Engineers; while, among others, there was Mr. D. L. Marsh, representing the Institution of Mechanical Engineers. With such organizations watching the work of their Institution, he thought it would be admitted that the importance of street lighting was fully recognized. The lights of the past, while doubtless adequate for their time, were not sufficient for to-day. The problem the members had before them was a highly important one; and its solution would be carefully watched by the various institutions which had long had the matter under their consideration. The visitors were greatly impressed by the kindly hospitality which had been extended to them on all hands.

Mr. H. DICKINSON (Liverpool) proposed "The President," who, he said, was an extremely able engineer, and had taken an immense interest in public lighting.

The PRESIDENT, in reply, declared that he was going to do his best to assist the Institution.

SECOND DAY'S PROCEEDINGS.

When the members re-assembled in the Music Room of the Royal Pavilion on Wednesday morning, Sept. 14, Mr. A. C. CRAMB, of Croydon (as President), again occupied the chair, and the reading of papers was proceeded with.

NOTES ON THE STREET LIGHTING OF BRIGHTON.

By JOHN CHRISTIE, M.I.E.E., Engineer and Manager of the Brighton Corporation Electricity Department.

[Extract.]

Brighton has been a pioneer in many ways; and with regard to electricity can claim to have been one of the "first in the field." So far back as 1881 an experimental lighting plant under the auspices of the Brighton Town Council was "tried out" on the Marine Parade. This installation comprised six arc lamps each run off its own "gramme" dynamo, belt driven from a small steam engine through a line shaft, and was then regarded as one of the wonders of the age. It only enjoyed a very short life; and the engineers of those days who had the pluck to carry out the experiment obtained little but experience for all their trouble and expenditure.

In 1891 the Corporation obtained and put into force their Provisional Order under the Electric Lighting Act, 1882, and were among the first three municipalities in the country to do so. These were Bradford, Brighton, and St. Pancras Vestry, London—I believe in the order mentioned. The municipal supply was inaugurated on Sept. 14, 1891, by the starting up of the North Road Steam Generating Station; and the first section of public lighting in King's Road was switched on officially on Sept. 16, 1893.

The less important side streets were dealt with in turn as the supply mains extended through the central and outlying areas of the town; the old gas lamp standards being gradually transferred to electricity until to-day, out of a total of 3704 public lamps, only 240 gas lamps remain. These are mainly in the back streets of the town, where there is little or no prospect of electricity mains being laid in the near future. So we may now be regarded as an all-electric town so far as public lighting is concerned, which, after all, is only natural, and is doubtless due to the gas supply being in the hands of a flourishing Company, and the electricity supply undertaking being municipally owned.

In passing, I would mention that, though the keenest rivalry exists between us for all fresh business, we are good friends, always respecting each others interests and apparently, for the present at least, obtaining as much new business as can be conveniently coped with.

Some years ago we tried gasfilled lamps in order to get higher candle power for the same wattage, but found the life short; and the efficiency, due to blackening, fell off so rapidly that the cost of lamp renewals was prohibitive, and we again had to revert to metallic filament lamps. With the recent improvements in manufacture and the maintenance guarantees now offered by the makers, we are again reverting to the gas-filled lamp, and are giving it a further trial.

RATES OF CHARGING FOR STREET LIGHTING.

On account of the good and regular load factor which this class of business affords, the supply undertaking charge for street lighting should be kept as low as possible in order liberally to encourage its use for this purpose. In Brighton we charge 1¾d. per unit based on the mean lighting hours as prescribed by resolution of the Town Council, multiplied by the wattage of the lamps in use. We have no meters. For this we lay and maintain all mains and services to street lighting free of charge, and bear all the capital charges in respect thereof. After meeting these charges, this rate only yields us the barest margin of profit.

All lamp renewals, stores, labour for maintenance, cleaning, lighting, and extinguishing are charged against the District Fund Account at net cost; and the total rate for the lighting of our town works out at the very low figure of 4·5d. in the £, so that a ratepayer assessed at £50 only pays 0·61d., or just over ½d. a day, towards his cost of lighting our streets and all the advantages accruing therefrom which he enjoys. I hold that in our town he gets most excellent value for this small share of what he is called on to pay for other services.

Data *re* our Lighting System.	Electric.	Gas.
No. high candlepower lamps	387	—
No. low candlepower lamps	3077	240
Total	3464	240
Approximate mileage of streets lighted	100	
Height of high candlepower lamps	25 ft.	
Height of low candlepower lamps	12½ ft.	
Lamps pitched at corners of streets otherwise	50 yds.	

Owing to the gradual development of our street lighting system, lamps have just been added to the ordinary lighting network in single units; and as a result the bulk of the lamps have to be lighted and extinguished by hand. In straggling outlying districts automatic time switches have been installed to save extra labour and additional beats.

I have carefully considered the several systems of automatic and time switch control, but on balance at the moment I cannot see that we could effect any material economy or increased efficiency by its general adoption. On the one hand, with manual operation you have labour, cleaning, repairs, renewals, and general maintenance, the most effective patrol service, and perhaps slight extra current consumption (not paid for) due to some of the lamps being lighted and extinguished before and after the mean lighting time. Against this, with automatic or time switch control you have heavy capital charges and de-

preciation from the somewhat delicate equipment, maintenance charges are higher, more skilled supervision is necessary, the patrol service is not so good, and it is difficult to synchronize large numbers (sometimes running into thousands) of time clocks, so that their erratic action probably more than neutralizes any saving in current over manual control which they might otherwise effect.

With the rapidly increasing motor traffic throughout the country generally, good street lighting is the greatest asset that any town can possess. It safeguards the public, assists the police, and makes our towns bright and attractive, thus encouraging trade.

The best and most intensive lighting which any town can afford is none too good for modern requirements; and it is up to us as the technical advisers of our several councils to put forward well-considered schemes suitable to the requirements of the areas which we control and for the lighting of which we are responsible, to use every effort with the "powers that be" to approve of them, and, when they do so, to see we give in return the best possible service and light value for the funds available.

Discussion.

Mr. H. DICKINSON (Liverpool) said he had been struck by the large proportion of streets in Brighton that were lighted by electricity. In Liverpool they had done a considerable amount of work towards improving the public lighting. Their main object was to improve the lighting of the main arteries, which was mainly by gas; but they found themselves up against the question of finance, and therefore thought it better to spend the money available over as wide an area as possible, rather than instal any elaborate and intensified lighting in comparatively few streets. They had not done much in the side streets except in the direction of improving the gas lighting. All new estates, wherever possible, were being lighted by electricity. They had about 125 miles of streets electrically lighted.

Mr. J. S. DOW (Illuminating Engineering Society) referred to the promenade lighting, and complimented Mr. Christie upon the excellent design of the standards and the general effect. He spoke in favour of diffusing globes.

GLARE.

Mr. L. E. BUCKELL (General Electric Company) said his impression of Brighton was that wherever one walked one got sufficient light; and in no circumstances was there glare. They had heard on the previous day a good deal about 13 ft. standards; and he thought Brighton showed there was some magic in this 13 ft. Was it not possible that the danger of glare was avoided by getting the lights 13 ft. up? He had always treasured a definition of glare which he heard some years ago. It was: "Glare is the projection of light in a manner to cause discomfort to the eye." This was a simple definition, and he thought it covered the ground. A properly lighted town saved the time of people compelled to use the streets, assisted health, was an aid to the police, and prevented accidents. Did it not seem that a rate of 4½d. in the pound was a very small charge for all this? He would like to know what chairmen and members of lighting committees would regard as a fair assessment for lighting, as compared with other public services.

EXPERIENCES IN GLASGOW.

Mr. S. B. LANGLANDS (Glasgow) referred to the splendid system of charging which Brighton had adopted. Mr. Christie had got his Committee to recognize that public lighting was an asset to them as owners of the electricity undertaking. Therefore he fixed his rate at the low figure of 1½d. per unit, and took a share of the capital charges. In Glasgow they did not do this; but they had a rate of 1½d. per unit. It should be remembered that public lighting was for the most part off the peak load. Except for, perhaps, two hours, all of it was valuable to the electricity plant. He had got his people in Glasgow to stand a rate of 8d. for public lighting; but they were paying for the coal strike of last year. The permanent lighting rate would, however, in the future be anything from 6d. to 7d. In Glasgow, shopkeepers were helping him by keeping their premises lit-up until 11 o'clock, at a reduced rate of charge.

SUCCESS OF AUTOMATIC LIGHTING AND EXTINGUISHING.

Mr. R. BURKETT (Southend-on-Sea) stated that at Southend they had no lamp-lighters; their lamps being automatically lit and extinguished. This automatic arrangement had not failed once in the two years during which it had been in operation. In fact, it had never erred a minute in lighting or in extinguishing.

Mr. R. DAVISON (Newcastle-upon-Tyne) remarked that in Newcastle there were 3000 gas lamps automatically lit by clockwork; and this was a paying proposition, because it cut the wages down 50 p.ct. Whereas formerly a man did 100 lamps with a torch, he was now able to look after 200.

A MILD PROTEST.

Mr. W. M. MASON (British Commercial Gas Association) said he rose really to enter a mild protest. Of course, from his position as an advertising man in the gas industry, they might think it was a case of having to say something on gas, when there was so much being said about electricity; but it was not this consideration that actuated him. What he desired to do was to protest against the attitude of mind of many of the members of that Institution, and perhaps particularly of the writer of this excellent little paper. To his mind, the main point that ought to appeal to public lighting engineers and chairmen of lighting committees was not merely whether the source was to be gas or electricity, but what were likely to be the respective costs, as compared with the illuminating power afforded. The paper revealed the complaisant attitude of mind of many electrical men who were his own personal friends, and for whom he had the greatest possible respect; but he suggested that it was a matter which needed very careful thinking about. The author said:

> "To-day, out of a total of 3704 public lamps, only 240 gas lamps remain. These are mainly in the back streets of the town, where there is little or no prospect of electricity mains being laid in the near future. So we may now be regarded as an all-electric town so far as public lighting is concerned, which, after all, is only natural, and is doubtless due to the gas supply being in the hands of a flourishing Company, and the electricity supply undertaking being municipally owned."

He failed to see where the logic of this statement came in. Though Brighton was electrically lit, and beautifully lit from many points of view, he would like to remind the meeting that some of the finest public lighting in this country—and, indeed, in the world—was by gas. ["Hear, hear."] Take Whitehall; take the centre of Birmingham; take some of the most beautiful sections of Wembley. Here they saw what gas could do. But whatever medium might be employed, the only sound way of judging these things was on their merits—according to illuminating value, and according to cost.

The PRESIDENT expressed the opinion that the form of lighting was generally settled by the desires of the town and of the council committees, and not by the officers. Therefore they got this variety all over the country.

Mr. HAYDN HARRISON pointed out that to reduce labour 50 p.ct. by automatic lighting and extinguishing was all very well, but then there was a tendency to do away with "scouting," and therefore with the obtaining of proper reports as to the condition of the lamps. The greatest advantage, to his mind, of hand control was that in that case one did get a report from the lamplighter.

Mr. T. J. BRANSFORD (Stepney) stated that in converting the public lighting of Stepney to electricity, which had been nearly completed, they had had every help from the gas people. They had worked most amicably together. He thought clocks were all very well for isolated positions; but difficulties arose when there were fogs, &c., to deal with. Mischievous children had also proved a trouble.

Mr. CHRISTIE replied that in Brighton they would have offered the Gas Company the lighting if they could not themselves have given a better light at a cheaper rate. But, on the contrary, the 240 gas lamps cost substantially more, and gave a less satisfactory light, than the electric ones.

Alderman JOHN GORDON (Liverpool) voiced the thanks of the meeting to the author for his paper.

STREET LIGHTING AND TRAFFIC PROBLEMS.

There followed a paper on the above subject by Mr. R. L. Matthews, Chief Constable of Leeds, which, together with a note of the discussion, will be published later.

LIST OF OFFICERS.

The HON. SECRETARY (Mr. W. J. Liberty) reported the result of the ballot, as follows:

President.—Mr. Alex. C. Cramb, Electrical Engineer and Manager, County Borough of Croydon.
Vice-President.—Mr. J. F. Colquhoun, Lighting Engineer, City of Sheffield.
Hon. Secretary.—Mr. W. J. Liberty.
Hon. Treasurer.—Mr. E. M. Severn, Public Lighting Superintendent, South Metropolitan Gas Company.
Hon. Editor.—Mr. E. J. Stewart, M.A., B.Sc., Public Lighting Department, City of Glasgow.
Ordinary Members of Council.—Messrs. W. H. Chapman (London), R. Mason (Birmingham), and T. Wilkie (Leicester).

The PRESIDENT announced that Mr. Dickinson had promised in due course to succeed Mr. Colquhoun as Vice-President.

PLACE OF NEXT MEETING.

Councillor R. H. MINSHALL (Chairman of the Lighting Committee, Sheffield) extended a cordial invitation to the Institution to go to Sheffield for their meeting next year; and this the members readily accepted.

A busy and successful conference closed with a hearty vote of thanks to the President for his conduct in the chair.

Western Junior Gas Association.—The Association's programme for the 1927-28 session is an excellent one. The first meeting will be on Oct. 8, when Dr. M. W. Travers, F.R.S., will deliver an address entitled "Some Problems of the Near Future."

Lectures on Coal.—A course of twelve lectures on "The Carbonization of Coal" will be given by Mr. J. Roberts, D.I.C., M.I.Min.E., during the autumn term at the Regent Street Polytechnic. The first lecture will be on Friday next, Sept. 30, from 7.30 to 9 o'clock. The fee for the course is 10s.

Society of Chemical Industry.—On Monday, Oct. 3, at the opening meeting of the London Section of the Society of Chemical Industry, Mr. W. J. A. Butterfield, M.A., F.I.C., Chairman of the Section, will give an address entitled "The Gas Industry; Past, Present, and Future." The meeting will be held at the Royal Society of Arts, John Street, Adelphi, at 8 o'clock. Anyone attending the meeting who is not a member of the Society should sign the visitors' book in the entrance hall.

MISCELLANEOUS NEWS.

GAS EXHIBITION AT FALKIRK.

An exhibition of gas appliances was held in the Falkirk Town Hall last week, and extended over five days. It was organized by the local Corporation and was opened by Ex-Provost MUIRHEAD, who for several years was Convener of the Gas Committee. Councillor KINNAIRD, who presided at the opening ceremony, gave a brief but interesting review of the history of Falkirk's gas undertaking, and concluded by saying that since 1920 that Department of the Corporation had provided a sum for rates and taxes and for the redemption of capital expenditure of £172,000. Local rates had taken the sum of £70,000; income-tax £23,000; and capital charges £79,000. The gas-works were actually providing £300 a week in rates and taxes. The possibilities of gas were not nearly exhausted, and there were great fields for its use in industry, if its possibilities were better known.

The exhibition was largely patronized, not only by the citizens, but by people from the surrounding districts. Among the popular features of the week were the cookery lectures, given twice daily by Miss E. M. Dods, M.C.A., of Edinburgh. The object of the exhibition was to popularize the use of gas by the introduction of modern apparatus. The Falkirk Corporation have already in operation a hire-purchase scheme for gas fires, and they now purpose to extend the hire-purchase facilities to wash-boilers, water heaters, geysers, and radiators. Though the Gas Department did not show any appliances, their stand was one of the most interesting. It displayed the bye-products extracted from coal in the manufacture of gas.

The firm of R. & A. Main, Ltd., Gotnic Works, Falkirk, who are pioneers in porcelain enamelling, introduced for the first time a cooker in all-enamelled finish. The cooker shown on their stand was one of their well-known "Maintenance" type, with "Conservor" oven and all the most modern accessories, including the "Mainstat" automatic cooking control. Every part of the cooker is finished with white porcelain enamel relieved by grey, with the exception of the hotplate bars, which are in black porcelain enamel. This new departure is attracting considerable attention, among both the public and the *cognoscenti*. Another new feature of these cookers is that the taps are finished with untarnishable plating which remains bright without the use of metal polish. All hotplates are provided with either ring or "ace" type boiling burners. The "ace" pattern has been redesigned, and may be had as a "Trey" with three flames, or as a "Cluster" with a larger number of smaller flames. All burners are interchangeable, and fit all present and pre-existing hotplates.

In gas fires the firm showed the "Cinderella," which has been improved in appearance, convenience, and durability, since its first introduction four years ago. For those who object to the formal lines of the more usual type of radiating material, the "Cinderella" with its "cokette" mat provides a fire which at a short distance cannot be distinguished from a glowing coke fire. It has been the means of converting many householders to the use of gas for room heating. Among other fires shown were many handsome examples of lacquer and art metal finishes.

Housing schemes are well provided for by Messrs. Main, who showed various built-in fires, with or without mantels, cookers, wash-boilers, gas-irons, and the like—in fact, everything that modern practice can suggest for lightening the labour of the house and, incidentally, reducing the use of raw coal with all its attendant disadvantages.

The Carron Company were prominently represented with productions which strongly appealed to the housewife. One of their outstanding exhibits was the No. 654 D "Esto" gas cooker. The extended hotplate of this cooker at once commends itself, while the plate rack is a great boon. The white porcelain enamel exterior also attracted attention. Other forms of the "Esto," together with the Company's smaller gas cooking appliances such as grillers, with or without oven top, and hotplates, were on view. Attractive types of gas mantel registers were on exhibition, in addition to the firm's latest gas fire—No. 599. Boilers of varying sizes for domestic and other purposes, including the "Carronade" wash-boiler, and gas irons with edges rounded to save the linen, were closely inspected by the visitors.

At the Falkirk Iron Company's stand, the leading exhibit was the firm's widely-known product, the "Smoothtop" gas range, which has been designed to meet the demand for a cooker giving the same oven and hotplate service as a coal fired range, combined with the speed, convenience, and economy of an ordinary gas cooker. The outstanding feature is the enclosed heat-retaining top. Supplied by burners set in front, the heat passes back to the flue outlets and brings the entire top to a cooking temperature. Four or more vessels, it is stated, can be kept boiling with only one burner in action. Vessels, after the contents have been cooked over the burners, can be slid across the polished top to any position without fear of tipping over. It is thus possible for food to be kept boiling or simmering as required.

The Forth & Clyde & Sunnyside Iron Company, Ltd., of Falkirk, were prominent with a distinctive exhibit in the "Silent Knight" gas fire. It is suitable for converting every type of coal fire grate to an up-to-date and efficient gas fire; and it was shown in a variety of attractive finishes. The firm also showed an all-white enamelled wash-boiler, with enamelled plates and top which can be cleaned with ease. The firm showed their "Adrian" portable gas boiler, specially designed for the Glasgow Corporation, for whom they have already installed 6000.

The stand of Messrs. Milne & Mitchell, of Glasgow, was a blaze of light. The shades exhibited were efficient and artistic.

The general display of appliances was enhanced by the geyser exhibits of Messrs. Ewart & Son, Ltd.

The promoters of the exhibition are highly gratified by the results, and are confident that it will lead to a wider use of gas.

BIRMINGHAM GAS DEPARTMENT.

Opening of New Sports Ground.

On Sept. 17 the Lord Mayor of Birmingham (Alderman A. H. James) formally opened "Hollyfields," the new sports ground of the recently-formed Social and Recreation Society of the Birmingham Corporation Gas Department. The ground, 20 acres in extent, is situated in Woodacre Road, off Holly Lane, Erdington, and was purchased several years ago by the Gas Department. It is an ideal ground, and has been admirably laid out into three football pitches, three cricket pitches, two bowling greens, and eleven tennis courts, four of which are hard. In addition there is a handsome and well-appointed club pavilion, 110 ft. long by 45 ft. wide, with all the amenities of a social club. It is intended shortly to instal a couple of billiard tables. The expenditure in connection with the furnishing and equipment of the clubhouse (which has one large hall suitable for concerts and the like) has been met by the employees of the Department, who will also defray the cost of the maintenance of the ground.

Alderman J. H. LLOYD (Chairman of the Gas Committee) presided at the opening ceremony, which was attended by many members of the Corporation, and officials and a large number of employees of the Department. That day marked for them, he said, the realization of what for many years appeared to be dreams which were unlikely ever to be fulfilled. The Gas Department was an organization of about 3500 individuals; and it was only natural there had always been many who wished to supplement their everyday association in business hours by the closer comradeship of the sports field. The Gas Committee, of which he had been a member for some 36 years, had not been ignorant of the activities of its employees in the realm of sport, or of the difficulties under which they laboured; and the Gas Committee therefore decided that the time was overdue when the Department itself should come to the assistance of its employees. The various sports and social bodies of the Department had combined, forming one Society under the direction of a democratically elected Committee and representing the whole of the recreational activities of the Department. Already 90 p.ct. of the employees had signified their willingness to pay for the maintenance of the ground.

The LORD MAYOR (who was accompanied by the Lady Mayoress) then declared the ground open. It was, he declared, one of the finest sports grounds in the country. The history of the Gas Department in the world of sport clearly demonstrated the need of such a ground. He warmly congratulated the members of the Gas Committee on the motives which prompted them in the acquisition of the site, and expressed the hope that the employees would do their part in its maintenance and upkeep. It was the team spirit in these things which always counted; and he hoped everyone connected with the Department in any capacity would do his share in making the venture a success. The proud position that the Birmingham Gas Department held among the gas undertakings of the country to-day was very largely due to its policy of "Service to the Consumer." If that Society were to flourish, regard must be had to the question of service to their fellow workers. ["Hear, hear."]

Thanks to the Lord Mayor and Lady Mayoress and to the Chairman were accorded on the proposition of Mr. A. W. SMITH (Secretary and General Manager of the Department), seconded by Mr. A. J. MERRILL.

During the afternoon three League football matches were played; ten of the tennis courts were in use; and matches were played on the bowling greens. Prizes were presented by Mr. JOHN FOSTER, the Engineer-in-Chief.

The Birmingham Corporation Gas Department Fitters' and Inspectors' Social and Recreation Society, which has been merged into the newly-formed Social and Recreation Society of the Department, recently held a farewell gathering at the White Horse Hotel, Birmingham. Opportunity was taken of the occasion to make a presentation to Mr. R. J. Rogers, Superintendent of the Fittings Department, who has acted as Chairman of the Committee of the Fitters' and Inspectors' Social and Recreation Society; and to Mr. R. G. Marsh, who was Hon. Treasurer during that period. The gift to Mr. Rogers took the form of a canteen of cutlery and a gold pencil, and that to Mr. Marsh, a gold watch. Each gift was suitably inscribed. Mr. E. H. Ward, Vice-Chairman of the Society, made the presentation, and Alderman Gregory and Councillor Hume, members of the Gas Committee, who were present, bore testimony to the excellent pioneer work done by Mr. Rogers in creating a sporting spirit in the Department.

TRADE NOTES.

"Silo" Gas Fires.

Messrs. Falk, Stadelmann, & Co., Ltd., Veritas House, Farringdon Road, E.C. 1, have published a new list illustrating and describing their "Silo" gas fires.

Wrought-Iron Tubes and Fittings.

The Wellington Tube Works, Ltd., of Great Bridge, have published a new catalogue of their wrought-iron tubes and fittings; and this will be of great value to gas engineers. It includes the specifications for wrought-iron gas, water, and steam tube strip, and gas, water, and steam qualities tubes and fittings, of the Institution of Gas Engineers. "Tubes, Past and Present" is the title of an introductory section of exceptional interest.

Cheaper Gas at Lostwithiel.—The Lostwithiel Gas Light and Coke Company announce a reduction in the price of gas by 5d. per 1000 c.ft. as from July 1 last, and a 5 p.ct. discount for prompt payment of accounts.

OPENING OF PORTHCAWL EXHIBITION.

The opening ceremony of the Porthcawl Exhibition, which was visited by the Wales and Monmouthshire District Institution of Gas Engineers and Managers on Thursday last (as reported in earlier pages of this issue), took place on Monday, Sept. 19.

Mr. D. J. REES, J.P. (Chairman of the Porthcawl Council), presided. He explained that this was the first event of the kind held at Porthcawl since the Council took-over the gas undertaking, though a similar exhibition was promoted by the old Porthcawl Gas Company twenty years ago. The organization, he remarked, was left to the Gas Committee, of which Mr. Russell Mabley was Chairman; and he wished to pay a public tribute to Mr. Mabley for the way in which he had carried out the work. He had received valuable assistance from Mr. Barry, the representative of Messrs. R. & A. Main, Ltd., whose technical knowledge had been a great help, as also had the efforts of Mr. S. Walker, the Manager to the Gas Department.

Mr. H. D. MADDEN (President of the Institution of Gas Engineers), in declaring the exhibition open, said he would like to commend the policy of the Porthcawl Urban District Council in regard to their gas undertaking. "Men," continued Mr. Madden, "seldom think domestically; but they are beginning to realize that the wife at home must have her domestic labour reduced as far as possible. Look what trouble she is saved by the use of gas for cooking, for water heating, for fires in the bedroom—fires to which she has to carry no coal and from which she has to clear no ashes. Raw coal is a material which should never be put on the fire. It is a complex material and was never put in the earth to be burned on a fire in the crude way we do, sending up the essences in the chimney to befoul the air. Everyone asks for a pure water supply; it is just as essential, and even more essential, that they should have pure air to breathe." By the use of gas fires they were gradually letting in more light for the especial well-being of the children. The benefit was coming to be recognized and appreciated.

It was now realized how valuable were exhibitions of that sort to demonstrate by the latest devices how useful an agent gas could be. The exhibition also served to show the value of service in keeping the cookers and other apparatus in a condition that would yield the best results. A gas fire or cooker would not last for ever without attention. It needed attention to maintain its efficiency.

Mr. Madden concluded by insisting that, far from gas having suffered by the intrusion of electricity, the reverse was the case. "Where big electricity undertakings are working side by side with gas concerns," he said, "the latter are increasing their output. The two industries can work and develop together in their true spheres of usefulness."

Seconding a vote of thanks to Mr. Madden, proposed by the CHAIRMAN, Councillor W. J. GRIFFIN said that Mr. Walker, the Gas-Works Manager, once told him that, in going through some books of the old Gas Company, he came across an entry which showed that the consumption of gas in one year was 1,000,000 c.ft. That was before the exhibition of twenty years ago, which, undoubtedly, gave a stimulus to the production and use of gas in the town.

AUSTRALIAN GAS LIGHT COMPANY.

The Annual General Meeting of the Company was held in Sydney on Aug. 11—Mr. GEORGE J. COHEN (Chairman) presiding.

Mr. ANDREW WILSON, M.Inst.C.E., the General Manager and Secretary, submitted the report of the Directors for the year ended June 30, recommending the payment of a dividend for the half-year of 4 p.ct. on the "A" and "B" shares.

The CHAIRMAN, in moving the adoption of the report, first of all expressed the regret of the Directors at the death of Mr. S. H. Cary, who for seven years was Deputy-Chairman of the Company. Mr. A. Consett Stephen had been elected to the position of Deputy-Chairman of the Company, and Sir Robert McC. Anderson had been appointed to fill the vacancy on the Board.

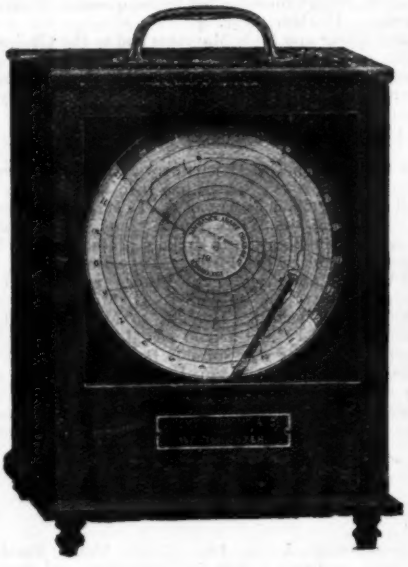
During the year under review, there had been an increase in the demand for gas in Sydney and suburbs, which increase had placed the Company in the proud position of being the sixth largest gas undertaking in the British Empire.

During the year, 8021 additional consumers were supplied with gas; the total number of consumers on the Company's books at the end of the year being 219,864. Extensions of mains and services totalling 62 miles and 61 miles respectively were made; the total mileage of mains at the end of the year being 1814, and of services 2468. The quantity of gas sold was 6475 million c.ft.—an increase of 1·37 p.ct.

The gross profit made during the year, after appropriating the sum of £170,000 as a contribution to the special purposes fund, was £387,236; and the net profit, after providing for interest on debentures and loans, was £291,914. Dividends for the past year at 8 p.ct. per annum would absorb £282,756, as compared with £261,109 for the previous year. The sum to be carried forward to the next year's accounts was £36,270, compared with £27,112 brought forward from the previous year. In pursuance of the policy of decentralizing the services which the Company gave to the public, two additional branch offices and service depôts were under construction—one at Campsie and another at Rockdale.

The Company had recently negotiated for the purchase of the assets of the Liverpool Gas Undertaking, and had arranged for the area of supply to include that municipality and the adjacent municipalities of Fairfield and Cabramatta. The use of gas for industrial purposes continued to increase. During the past year, 40 million c.ft. more was employed for such purposes; being an increase of 16 p.ct. over the quantity used during the preceding year.

The report was unanimously adopted.



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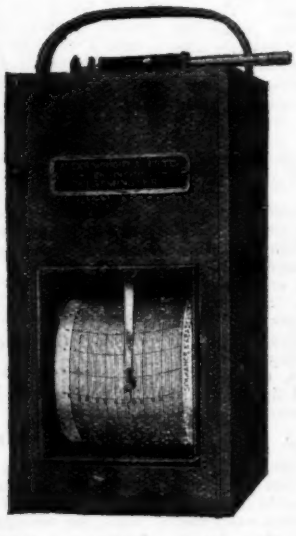

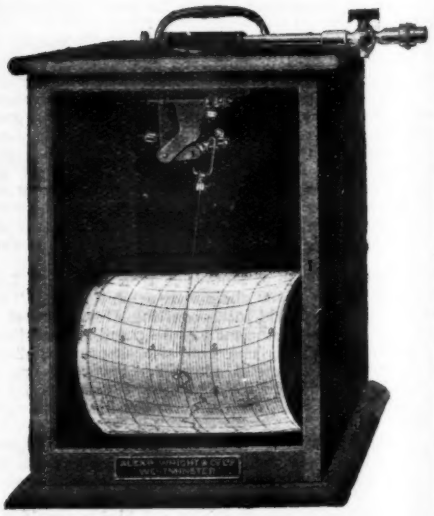

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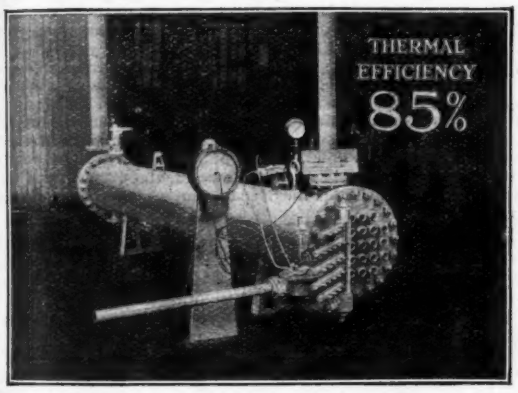

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TOTTENHAM GAS COMPANY'S NEW BRIDGE.

Improvements at Willoughby Lane.

In the "Weekly Herald" for Sept. 23 is an account of the new bridge which has been built by the Tottenham District Light, Heat, and Power Company over the ancient public footpath crossing the L. & N.E.R. line. The bridge is 24 ft. wide, and is of reinforced concrete. It leads to Walthamstow and Higham Hill, and provides access to the northern portion of Tottenham Marshes. "The old footpath," states the "Weekly Herald," "was much used by Edmonton and Tottenham children, and was a constant peril in their having to cross the four sets of railway lines. The Gas Company have greatly contributed to public safety in substituting the spacious bridge which, henceforth, future generations will traverse on their way for games on the Marshes. Moreover, the provision of the bridge will obviate the use of two private level crossings in the occupation of the Company, who possess an extensive parcel of land on the east side of the railway. Part has already been utilized for the erection of chemical works dealing with bye-products made during gas manufacture. With the completion of those additions, it was found advisable to construct a road-bridge in lieu of the old crossing; an agreement being reached on that subject between the Gas Company and the Railway Company."

CONTRACTS OPEN.

Pipes and Lamp Pillars.

The Gas Committee of the Ilkley Urban District Council are inviting tenders for cast iron or steel pipes. [See advert. on p. 765.]

The City of Sheffield are inviting tenders for the supply of lamp pillars. [See advert. on p. 765.]

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Sept.* 26.

Pitch is somewhat quieter, and prices are a little irregular. Creosote, on the other hand, is in demand, and supplies are scarce. Current values are as follows:

Pitch 90s. to 92s. 6d. net per ton in bulk.
Creosote 8¾d. net per gallon in bulk.
Pure benzole 1s. 5d. to 1s. 6d. per gallon.
Pure toluole 2s. per gallon.
Solvent naphtha 95/160 1s. 2d. to 1s. 3d. per gallon.
Pyridine 6s. to 6s. 6d. per gallon.

Tar Products in the Provinces.

Sept. 26.

Markets for tar products have been steady during the past week with the exception of pitch, which is decidedly easier.

There has been no pressure to sell on the part of makers; but merchants have been quoting lower prices on the Continent.

Creosote is still very firm. There is a considerable inquiry both for home and export.

Water-white products are quiet. There is a slightly firmer tone about the market for solvent naphtha. Cresylic acid is still very firm indeed, for both prompt and forward delivery.

Crude carbolic acid is firm for both prompt and forward delivery, with a premium for prompt.

In naphthalene, the market for pure is rather firmer.

The average prices of gas-works products during the week were: Gas-works tar, 61s. to 66s. Pitch—East Coast, 84s. to 85s. f.o.b. West Coast—Manchester, 79s. to 80s.; Liverpool, 82s. to 82s. 6d.; Clyde, 83s. to 84s. Benzole, 90 p.ct., North, 1s. 1d. to 1s. 2d.; crude, 65 p.ct. at 120° C., 10d. to 10¼d., naked at makers' works; 50/90 p.ct. naked, North, 1s. 3d. to 1s. 4d. Toluole, naked, North, 1s. 4d. to 1s. 5d. nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 9¼d. to 10d. Heavy naphtha, North, 10d. to 1s. Creosote, in bulk, North, liquid, 7¼d. to 7⅝d.; salty, 7⅛d. to 7½d.; Scotland, 7½d. to 7⅞d. Heavy oils, in bulk, North, 8¾d. to 9¼d. Carbolic acid, 60 p.ct., 2s. 6d. to 2s. 7d. prompt. Naphthalene, £11 to £14; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Reduction in Price at Liverpool.—A reduction in the price of gas from 8·6d. to 8d. per therm, as from the September meter readings, is announced by the Liverpool Gas Company. Hightown and Woolton will in future pay the same price as other consumers in the city, instead of 12·6d. and 11·6d. per therm respectively. The charges for gas supplied through meters will go down to 9·5d. a therm; discount on all collections after Oct. 30 being increased to 9·75 p.ct.

Preference Stock Issue at Deal.—An issue is being made by Messrs. A. & W. Richards, on behalf of the Directors of the Deal and Walmer Gas Company, of £20,000 of 6½ p.ct. redeemable preference stock—the minimum price of issue being fixed at par, at which rate the stock is to be redeemed in October, 1937. The Company enjoy a rapidly extending business. The town of Deal possesses a considerable business and residential population, and its attractions as one of the south-east coast watering places bring many visitors during the summer months; while the new coalfield in the immediate vicinity (the Betshanger mine being only 3 miles away) is causing considerable developments, which will increase with the larger production of coal. Tenders have to be sent to Messrs. Richards at 37, Walbrook, London, E.C., by the morning of Thursday, Oct. 6.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The market still fails to show any improvement. If anything, it has been quieter than ever during the past week. Inquiries from abroad are very scarce, and the export trade upon which this district so largely depends holds out no promise. Only the best qualities of coal can see as much as a week or so ahead, and even these have in many cases to curtail production.

Northumberland steams are experiencing very lean times, and best screened sorts find difficulty in obtaining orders even at 14s. f.o.b., at which the loss must be very heavy. Gas coals are not finding much improvement with the season, though Wear Specials and best qualities are steadily quoted round 16s. to 16s. 3d. f.o.b. Seconds are nominally 13s. 9d. to 14s. 3d., though many brands are obtainable for prompt at less than this, and a few have been done as low as 13s. There is no demand for coking coals, and they remain nominally 13s. 6d. to 14s. Ordinary bunkers are plentiful, and there is keen competition for orders, as little as 13s. having been taken by collieries in bad need of trade.

Altogether the outlook is most depressing. Enormous losses are being made in both Northumberland and Durham, and no one can suggest where any improvement is likely to come from.

YORKSHIRE AND LANCASHIRE.

The gas coal trade in Yorkshire and Lancashire has resumed its usual level for the time of the year, and practically all gas undertakings have bought ahead at low rates. Furnace coke is moving slowly, and has rather declined in value.

House coal orders are moving more freely with the approach of colder weather and of the advance in prices, although matters have been a little quieter during the past few days. Some collieries have decided to wait until the end of the month before making an effort to raise their figures 2s. per ton, as they are of opinion that the state of trade does not warrant an earlier change. A number who have been cutting during the summer months to keep the pits going have already made increases of 1s. 6d. to 2s. per ton.

It is unfortunate that the industrial outlook does not improve, for better working hours at the pits will mean increased production of manufacturing fuel, which is already difficult to dispose of even at prices much below cost of production.

The export market has no redeeming feature. Washed singles appear to be the grade in best demand for shipment.

The following are current Humber bunker and export prices (f.o.b. usual shipping ports): South Yorkshire—Hards, Association, 16s. 3d. to 16s. 6d.; screened gas coal, 16s. 3d. to 16s. 6d.; washed trebles, 16s. 6d. to 16s. 9d.; washed doubles, 15s. 6d. to 16s.; washed singles, 15s. 3d. to 15s. 6d.; washed smalls, 11s. 3d. to 11s. 6d.; rough slack, 9s. 6d. to 9s. 9d.; smithy peas, 17s. 3d. to 17s. 9d. per ton. West Yorkshire—Hartley's (f.o.b. Goole), 14s. 6d. to 15s. 6d.; screened gas coal, 14s. 6d. to 15s. 6d.; washed trebles, 15s. 3d. to 16s.; washed doubles, 15s. to 15s. 6d.; washed singles, 15s. to 15s. 6d.; washed smalls, 10s. 6d. to 11s.; unwashed trebles, 15s. to 15s. 6d.; unwashed doubles, 11s. 9d. to 12s.; rough slack, 9s. 3d. to 9s. 6d.; coking smalls, 10s. per ton. Derbyshire and Nottinghamshire—Top hards, 17s. to 18s. 6d.; washed doubles, 16s. to 16s. 3d.; washed singles, 15s. 3d. to 15s. 6d.; washed smalls, 10s. 6d. to 11s.; rough slack, 9s. 6d. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 14s. 6d. to 15s.; gas coke, 20s. 6d. to 21s. 6d.; furnace coke, 18s. 6d. to 19s. per ton.

MIDLANDS.

Lower temperatures are putting more life into the house coal trade, and some of the pits are making a larger output. It is exceptional for any of them to work less than four or five days a week, and in some cases full time is necessary to keep abreast with orders.

Stocks have been put down on a larger scale than colliery managements had expected having regard to the manifest disparity between productive capacity and consumptive requirements. The opening of October will be marked by advances in price at many of the collieries, but they are likely to be confined to house qualities. The advantage which has been taken of summer prices necessarily modifies policy to some extent when new lists are under consideration.

Inquiries for considerable tonnages of industrial fuel are coming on the market; but actual business has not broadened appreciably. Meanwhile, slacks and smalls are being produced faster than they can be absorbed. Considerable quantities are being put on the ground at collieries where suitable conditions exist. Where clearance is imperative, very low spot prices are being accepted. Fine slacks have been obtainable at 3s. to 4s. at the pits. Prices of coke are unchanged.

Gas and the Lighting of an Institution.—The Torrington Board of Guardians, on Sept. 17, again considered the question of substituting gas as an illuminant for the oil lamps at present in use at the Institution. It was reported that the local Gas Company had revised their terms, and would undertake to lay the whole of the pipes for £80; the annual cost of the supply being estimated at £50. Oil lighting costs the Board between £30 and £32 per annum, *plus* £10 for breakages, and a certain amount for labour. A letter was read from the Ratepayers' Association protesting against the suggested installation of gas on the ground that the present system of lighting had proved satisfactory. The Chairman expressed his opinion that oil was a thing of the past in an institution like theirs; and another member remarked that before taking action they should be satisfied that gas meant economy. A third member said it was possible that they would have a national electricity scheme in the near future, and it would be a waste of money for them to go to any expense on gas installation if they were soon to have another scheme thrust upon them. Ultimately it was decided to postpone the question for six months.

Reduction in Price at Blackpool.—The Blackpool Gas Committee have decided to reduce the price of gas by 2½d. per 1000 c.ft., from 2s. 11d. to 2s. 8½d. (the pre-strike charge). The new price will come into operation on Oct. 1.

Sedgley Gas Undertaking.—The expenditure in connection with the supply of coal was increased, owing to the coal dispute, last year by £3500 over the preceding year, states the annual report of the Sedgley Gas Committee. After paying all charges, including interest and repayment of loan, there was a net profit of £995. This was absorbed in the payment of capital expenditure during the year, which amounted to £1441.

Results at Darlington.—When one considers the difficulties of last year, Mr. A. E. Ruffhead is to be congratulated on the results of the working of the Gas Department for the year ended March 31. The gross profit was £12,428, and the net profit £3562. The latter was appropriated as follows: To rate relief, £1000; to gas-works reserve account, £2562. The gas sold amounted to 615,245,020 c.ft., compared with 578,661,898 c.ft. during the previous year.

Gas Lecture at Tottenham.—By far the largest weekly gathering of the Tottenham Rotary Club took place on Sept. 19, when Mr. H. C. Smith, the Engineer of the Tottenham District Light, Heat, and Power Company, delivered an address on "Gas." Afterwards, the members of the Club visited the gas-works, where the processes he had explained in his address were seen in actual working. Subsequently the visitors were entertained at tea by the Company.

Good Working at Padiham.—In his report on the working of the Padiham Gas Department for the year ended March 31, Mr. H. W. Dean, the Engineer and Manager, states that the gas sold increased to 130,106,923 c.ft.; this being 6·1 p.ct. more than the previous year. The revenue expenditure and income during the year were £38,730 and £43,795 respectively, leaving a gross profit of £5065, equal to 14·3 p.ct. on the Department's outstanding debt. Interest on loans and sinking fund contributions absorbed £3995, leaving a net profit of £1069, as compared with £3386 last year. Mr. Dean mentions that the Local Government Auditor, at the conclusion of his audit of the Gas Department's accounts for 1925-26, recommended that the Department should build-up a sum of money for the purpose of a working balance. In spite of this, however, the Council had decided to appropriate £1000 from the Department's net profits for relief of the rates.

Results at Colwyn Bay.—The Colwyn Bay Urban Council, at their meeting on Sept. 20, had before them the accounts of the gas undertaking for the last financial year. In presenting the statement, Mr. E. Wilson (Chairman of the Lighting Committee) said that the gas consumed amounted to 178,792,100 c.ft.—an increase of 9,111,400 c.ft. on the year, equal to 5 p.ct. The total income was £46,511—an increase of £2799—and the expenditure, excluding loan charges, amounted to £41,254, an increase of £8157. The gross profit for the year was £7257, a decrease of £5359 over the previous year; but out of this amount had to be met £9800 in respect of loan charges, &c., which left a deficiency of £2543 on the year. This, deducted from the surplus brought forward of £6010, reduced the latter to £3467. The report and accounts were adopted; the opinion being expressed that what had been done by the Lighting Committee in times of stress was greatly appreciated.

British Gas Light Company, Ltd.—At to-day's meeting of the Company, the Directors will submit the report and accounts for the year ended June 30. The result of the year's working is that, after providing for interest on debentures and debenture stock, the net revenue amounts to £82,590, which, with the undivided balance brought forward from the preceding year, leaves an available balance of £152,583. From this sum the Directors have paid the dividend at the rate of 7 p.ct. per annum, less income-tax, on the cumulative preference stock, and an interim dividend at the rate of 3½ p.ct., less income-tax, on the ordinary stock, and have transferred the sum of £10,000 to the general reserve fund (London). They now recommend that a final dividend on the ordinary stock at the rate of 4 p.ct., less income-tax, making 7½ p.ct. for the year, less income-tax, be paid. This will leave a balance of £84,283 to be carried forward. The loan capital has been increased by the issue of £200,000 of 5 p.ct. debenture stock. The quantity of gas sold during the year was 5 p.ct. more than in the year to June, 1926. The Norwich Gas Order having been granted by the Board of Trade, the Company's Wymondham undertaking has now been incorporated with that of Norwich.

Colonial Gas Association, Ltd.—After provision for depreciation, the balance of revenue account for the year ended June 30 amounts to £76,948. Adding the balance brought forward—viz., £11,515—and deducting the bank loan and debenture interest, also the English income-tax on investments, and the interim dividends paid in April last, the amount available for final dividends is £46,779. The Directors recommend payment of a dividend on the preference shares for the year at the rate of 8 p.ct. per annum, less interim dividend of 4 p.ct. paid in April last; and a dividend on the ordinary shares for the year at the rate of 9 p.ct. per annum, less interim dividend of 4½ p.ct. paid in April last. Also that the sum of £8000 be set aside for Australian taxation on profits earned for the year ended June 30, and that the sum of £3000 be added to reserve fund. This will absorb the sum of £35,045, leaving to be carried forward to next year's account the sum of £11,734. The sales of gas for the year show an increase of 17·8 p.ct. over the preceding year. Amalgamations have been effected during the year with the following Gas Companies: The Maitland Gaslight Company, Ltd., the Grafton Lighting Company, Ltd., the Tamworth Gas and Coke Company, Ltd., and the Singleton Gas Company, Ltd. The Hay Gas-Works have been purchased during the year, and a controlling interest has been acquired in the Wollongong Gaslight Company, Ltd. A private Company has been incorporated, financed by the Association, for the purpose of manufacturing "Duratar," a special road-making material derived from tar produced, at the Footscray Works, in the vertical carbonizing plant.

STOCK MARKET REPORT.

GENERALLY speaking, the past week was a depressing one in most of the Stock Exchange markets. With the end of the twenty-one day Account, there was a certain amount of profit taking, but it was only in the industrial markets that there was any animation in the dealings. Gilt-edged securities were firmer, and the Treasury 4½ p.ct. "G" Series were in demand. The 3½ p.ct. conversion loan continued to be the chief subject of discussion in this market, but no important movement is expected until the operation is concluded. Among the Foreign stocks, Brazilian and Japanese loans and Spanish fours found favour. Home Rails were practically lifeless, in spite of the hopeful trade outlook. Business in the Industrial market was chiefly in specialities—such as match, gramophone, and margarine shares. Teas were inclined to improve, but both Rubbers and Oils were depressed and somewhat easier.

In spite of the general depression, the prices of Gas Stocks and Shares remained steady, though the number of recorded transactions was less than usual. As will be seen from the Table, several small increases in value occurred, but Tynemouth consolidated and new fell back 3½ points to 80-82 after the previous week's rise of 10½ points.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 85, 85⅜, 4 p.ct. debenture 65⅜, Commercial 87, Gas Light and Coke 87½, 87⅝, 87⅞, 88, 88⅛, 88¼, 3½ p.ct. 60¾, 5 p.ct. debenture 99⅝, Imperial Continental 140½, Maidstone 5 p.ct. 108½, 109½, Primitiva 16s. 6d., 16s. 7½d., 16s. 9d., 16s. 9¾d., South Metropolitan 102½, 102⅝, 103, 6 p.ct. preference 110½, 111, 3 p.ct. debenture 58½, 58⅝, South Suburban 5 p.ct. debenture 94½.

On Tuesday, Commercial 87, 87⅜, European 6⅞, Gas Light and Coke 87½, 87⅞, 3½ p.ct. 60, 3 p.ct. debenture 59½, 5 p.ct. debenture 99⅞, Imperial Continental 140½, 141, Montevideo 91½, Primitiva 16s. 4½d., 16s. 6d., Sheffield "C" (5 p.ct.) 95, South Metropolitan 102½, 102⅝, 3 p.ct. debenture 59½. Supplementary prices, Montevideo 5 p.ct. debenture 88½, Southend-on-Sea 5 p.ct. debenture 87, 87½.

On Wednesday, Commercial 87, European 6 11/16, 6⅞, Gas Light and Coke 87½, 87⅝, 88, 88¼, 3½ p.ct. 60½, 4 p.ct. preference 76½, 3 p.ct. debenture 59⅝, 5 p.ct. debenture 99⅞, Primitiva 16s. 6d., 16s. 7½d., 16s. 9d., South Metropolitan 102, 102½, 102⅝, 6 p.ct. preference 110½, Tottenham "B" (3½ p.ct. std.) 91.

On Thursday, Cape Town 4½ p.ct. debenture 73, 74, Gas Light and Coke 87½, 88, 88 7/16, 88½, 4 p.ct. preference 75½, 3 p.ct. debenture 59¼, 59⅝, Primitiva 16s. 4½d., 16s. 9d., South Metropolitan 102, 102½, 103, South Suburban 5 p.ct. 104½, Tottenham "B" (3½ p.ct.) 92. Supplementary prices, Hornsey 5 p.ct. preference 84.

On Friday, Bournemouth 4 p.ct. debenture 76, Commercial 88, 3 p.ct. debenture 56½, Continental Union 32, Gas Light and Coke 88, 88⅛, 88¼, 88⅜, 88⅝, 88⅞, 3½ p.ct. 60½, 60⅝, 4 p.ct. preference 75½, 3 p.ct. debenture 59½, 59⅝, Hong Kong 13, Imperial Continental 142, Primitiva 16s. 4½d., 16s. 10½d., Wandsworth 4 p.ct. debenture 75. Supplementary prices, Metropolitan (of Melbourne) 9⅜.

In Lombard street loanable funds were again in plentiful supply; and for renewals and fresh accommodation the charge was 3½ p.ct., falling to 3 p.ct. for new loans towards the close. The discount market was a little easier, but the lower rate at which Treasury Bills were allotted was not thought to be the cause.

On the Foreign Exchange Market, there was again considerable activity in Spanish pesetas, and the Madrid rate moved against this country, closing at 27.69½—a decline of 17/16c. The dollar-sterling improved on American money deposits in London, and the quotation finished ⅛c. higher at 4.86⅞. Several Continental gold exchanges moved in sympathy, both the Dutch and the Swiss rates being higher. The German rate, however, closed lower at 20.41½. French francs were steady at 124; but Italian lire were a shade dearer at 80.22½.

Silver was firmer, the price rising ¼d. to 25⅝d. per oz. Gold remained at the nominal price of 84s. 11½d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. The Banks' deposit rate is 2⅛ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2⅝ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Sept. 23.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 10	5	5	Aldershot 5 p.c. max. C.	68—73*	..	..
228,992	,,	,,	4	4	Do. 4 p.c. Pref.	67—70*	..	..
1,551,868	,,	Apl. 7	6½	7	Alliance & Dublin Ord.	84—87	..	85—86⅜
274,000	,,	July 14	4	4	Do. 4 p.c. Deb.	64—67	..	65⅜
532,554	,,	Aug. 25	—	7	Barnet Ord. 7 p.c.	101—104	..	..
800,000	1	Apl. 28	1/7½	1/7½	Bombay, Ltd.	1 1/16—1 1/16	..	..
170,000	10	Aug. 25	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
600,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c.	10⅝—11½	..	..
80,000	Stk.	June 29	3	3	Do. 3 p.c. Deb.	55—58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	74—77	..	76
367,900	,,	Aug. 25	—	7½	Brighton & Hove 6 p.c. Con.	102—105	..	..
341,800	,,	,,	—	6/8/6⅔	Do. 5 p.c. Con.	92—95	..	..
1,487,500	,,	July 28	5	5	Bristol 5 p.c. max.	84a—85a	+½	..
885,000	,,	Mar. 24	8	7	British Ord.	109—112	..	..
100,000	,,	June 29	7	7	Do. 7 p.c. Pref.	112—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	73—78	..	..
200,000	,,	,,	—	33/2	Do. 5 p.c. Red. Deb.	94—96	..	..
100,000	10	May 26	6	8	Cape Town, Ltd.	7½—8½	..	..
100,000	10	Apl. 28	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
140,000	Stk.	June 29	4½	4½	Do. 4½ p.c. Deb.	70—75	..	73—74
886,880	,,	July 28	6	6	Cardiff Con. Ord.	100—103	..	..
387,860	,,	June 29	7½	7½	Do. 7½ p.c. Red. Deb.	100—103	+1	..
107,150	,,	Aug. 11	6½	5	Chester 5 p.c. Ord.	87—92b	..	..
79,185	1	Apl. 28	†2/-	†2/-	Colombo Ltd. Ord.	29/—31/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
231,490	1	Apl. 7	1/9⅜	1/9⅜	Colonial Gas Assn. Ld. Ord.	25/—27/-	..	..
178,900	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
2,073,380	Stk.	July 14	—	5	Commercial Ord.	86½—88½	..	87—88
475,000	,,	June 16	3	3	Do 3 p.c. Deb.	56—59	..	56½
800,000	,,	Sept. 30	‡3	‡1	Continental Union, Ltd.	32—35	−1	32
200,000	,,	Mar. 10	7	7	Do. 7 p.c. Pref.	84—86	..	..
197,560	,,	Aug. 11	6½	6½	Croydon sliding scale	98—99	..	..
400,100	,,	,,	5	5	Do. max. div.	77—80	..	..
492,370	,,	Aug. 25	9	6	Derby Con.	103—105e	..	..
55,000	,,	June 29	4	4	Do. Deb.	78—75e	..	..
300,000	,,	Aug. 25	5	5	East Hull Ord. 5 p.c.	78—81	..	..
50,000	,,	June 16	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
1,002,180	10	Mar. 24	†3	†3	European, Ltd.	6½—7	..	6½—6⅞
18,747,450	Stk.	July 28	5	5	Gas Light & Coke 4 p.c. Ord.	87—89	..	87½—88⅜
2,500,000	,,	,,	8½	8½	Do. 8½ p.c. max.	59—61	..	60—60⅜
4,167,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	74½—76½	..	75½—76½
5,629,620	,,	June 16	3	3	Do. 3 p.c. Con. Deb.	58—60	..	59½—59⅝
181,815	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	101—104	..	..
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	98½—100½	+½	99⅞
49,000	,,	,,	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
93,500	,,	Aug. 25	6⅜	6⅜	Hastings & St L. 5 p.c. Conv	88—91	..	..
358,740	,,	,,	5⅛	5⅛	Do. 5⅛ p.c. Conv.	66—69	..	..
70,000	10	Apl. 28	†10	†10	Hongkong & China, Ltd.	12—13	..	13
173,300	Stk.	Aug. 25	5	5	Hornsey Con. 5⅛ p.c.	65—68	..	..
1,978,000	,,	May 12	10	10	Imperial Continental Cap.	140—142	..	140½—142
225,130	,,	Aug. 11	3½	3½	Do. 3½ p.c. Red. Deb.	68—70	..	..
295,242	,,	Aug. 11	6½	7	Lea Bridge 5 p.c. Ord.	94—97	..	..
2,145,907	,,	Aug. 11	5½	5½	Liverpool 5 p.c. Ord.	84—85	..	..
800,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	..
145,736	,,	Aug. 25	8	9	Maidstone 5 p.c. Cap.	107—112	..	108½—109½
69,490	,,	June 16	3	3	Do. 3 p.c. Deb.	52—55	..	..
75,000	5	June 16	†7	†8	Malta & Mediterranean	5—6½	..	..
541,920	Stk.	May 26.	†5	†7	Montevideo, Ltd.	91—93	+1	91½
2,061,315	,,	July 28	5	5	Newcastle & Gateshead Con	74½—75½d	..	..
260,929	,,	,,	4	4	Do. 4 p.c. Pref.	69½—70½d	..	..
691,705	,,	June 27	3½	3½	Do. 3½ p.c. Deb.	66½—67½d	..	..
131,785	,,	Aug. 25	—	6/18,0	North Middlesex 5 p.c. Con	90—93	..	..
300,000	,,	Apl. 28	9	7	Oriental, Ltd.	100—102	..	..
188,120	,,	June 21	7½	7½	Plym'th & Stonehouse 5 p.c.	102—107	..	..
414,500	,,	Aug. 25	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	102—105	..	..
296,782	,,	,,	5	5	Do. 5 p.c. max.	76—79	..	..
2,289,909	1	,,	—	—	Primitiva Ord.	16/3—17/3	—/3	16/6—16/10½
283,200	100	June 1	4	4	Do. 4 p.c. Red. Deb.	84—86	..	..
800,000	Stk.	July 28	4	4	Do. 4 p.c. Red. Deb. 1911	72—74	..	..
434,963	,,	June 29	—	4	Do. 4 p.c. Cons. Deb.	72—74	..	..
150,000	10	Mar. 24	6	6	San Paulo 6 p.c. Pref.	7½—8½	+½	..
125,000	50	June 29	5	5	Do. 5 p.c. Red. Deb.	46—49	..	..
270,000	Stk.	Mar. 24	5⅜	5⅜	Sheffield A	99¼—100¼e*	..	..
419,968	,,	,,	5⅜	5⅜	Do. B	99¼—100¼e*	..	..
1,047,000	,,	,,	5⅜	5⅜	Do. C	99¼—100¼e*	..	95
90,000	10	May 26	4	6	South African	4—6	..	..
6,609,895	Stk.	Aug. 11	7	5	South Met. Ord.	102—104	+½	102—103
500,000	,,	—	—	—	Do. 6 p.c. Irred. Pf.	109—112	..	110½—111
1,895,445	,,	July 14	3	3	Do. 3 p.c. Deb.	57—60	..	58½—59½
784,000	,,	Mar. 10	6½	6½	Do. 6½ p.c. Red. Db.	100—102*	..	..
91,500	,,	Aug. 11	8½	8½	South Shields Con.	101—103d	..	..
1,343,795	,,	July 28	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	104½
968,837	,,	June 16	5	5	Do. 5 p.c. Deb.	93—96	..	94½
647,740	,,	Mar. 24	5	5	South'mpton Ord. 5 p.c. max	73—76*	..	..
121,275	,,	June 29	4	4	Do. 4 p.c. Deb.	71—74	..	..
250,000	,,	Aug. 25	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,000	,,	June 16	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	..
150,000	,,	July 28	7½	7½	Tottenham District A 5 p.c.	105—108	..	..
982,275	,,	,,	6½	6½	Do. B 5⅛ p.c.	89—92	..	91—92
150,000	,,	,,	5⅛	5⅛	Do. 5⅛ p.c. Pref.	95—98	..	..
181,255	,,	June 16	4	4	Do. 4 p.c. Deb.	72—75	..	..
288,251	,,	Mar. 10	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c.	80—82d	−3½	..
280,094	,,	Aug. 25	6½	6½	Do. 5 p.c. pref.	85—90	..	..
88,880	,,	,,	5	5	Wandsworth, Wimbledon, and Epsom—	88—88	..	..
80,000	,,	July 14	8½	8½	Wandsworth A 5 p.c.	117—122	..	..
355,676	,,	,,	7	7	Do. B 5½ p.c.	100—105	..	..
422,585	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	..
852,000	,,	,,	6⅜	6⅜	Do. Wimbledon 5 p.c.	98—103	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	100—105	..	..
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	93—98	..	..
88,418	,,	June 29	3	3	Do. 3 p.c. Deb.	55—58	+2	..
284,743	,,	,,	4	4	Do. 4 p.c. Deb.	73—76	..	75

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The commencing Salary will be £1500 per Annum.

Sealed Applications, with *copies* of Two recent Testimonials, endorsed "Gas Department, General Manager and Chief Engineer," are to be Delivered to the Town Clerk, Town Hall, Manchester, on or before the 14th of October, 1927.

Canvassing in any form, oral or written, direct or indirect, will be regarded as a Disqualification, and Applications are to be sent only to the undersigned.

By order,
P. M. HEATH,
Town Clerk.

Town Hall,
Manchester.